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DYNAMIC APOPLEXY.

THE TRUE CAUSE OF DEATH BY ELECTRIFICATION AS CARRIED OUT BY THE PRESCRIBED LAWS OF THE STATE OF NEW YORK IS DUE TO DYNAMIC APOPLEXY.

BY J. MOUNT BLEYER, M.D., F.R.A.M.S.

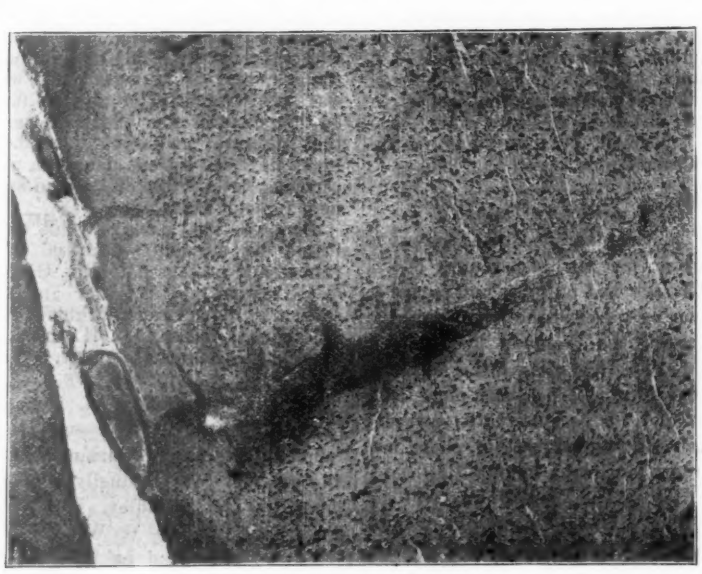
I cannot refrain from answering and setting at rest those minds who still harbor the idea on this subject that the act of electrification does not kill the condemned criminal who has been subjected to this mode of execution as prescribed by the laws of the State of New York; but that also more murderers have paid the penalty of their misdeeds on the post-mortem table than in the electrification chair. I claim, from what is here put in evidence against these fallacious claimants, to be able to quiet the most scientific of them.

Upon these points much comment has been made, viz.: (1) The true cause of death; (2) the possibility of resuscitation after electrification, and (3), the surgeon's knife as the cause of death. The most startling one of them all to those who have worshiped these fallacious theories will be that the cause of death after receiving a lethal dose of current is due to *dynamic apoplexy*. This fact I have ascertained by close investigation. The other remaining points are disposed of by what follows:

We owe to our colleague, Professor D'Arsonval, of Paris, the revival of these discussions, which were founded upon some experiments, showing that resuscitation after electrification is possible. This brought many scientific men and journals of all descriptions into the field, and a campaign was waged against such a painless and certain death penalty, which rids society of its venomous vipers. It is all too fresh in our minds to go into the details of the professor's teachings, but a few words to refresh ourselves will aid to comprehend my statement founded upon several post-mortem examinations on animals, and pathological and microscopical views of their organs.

The most convincing proof of them all, however, is afforded by the case of David Hampton, who was electrified at Sing Sing, N. Y., January 28, 1895, whose lesions of internal organs and hemorrhages show death to have been instantaneous and painless. I wish to make known the fact that as far back as 1888 these observations of the true cause of death were known to me. At that date experiments were being carried out under the auspices of the Medico-Legal Society of New York, of whose committee I was a member. Mr. Edison placed his laboratory at their disposal, and Mr. Kennelly, the chief electrician, aided the work. Several animals were electrified to the entire satisfaction of the committee that such a mode of executing criminals was a most humane method. After each subject had thus been executed its body was placed in my charge for post-mortem and further examination, and I then found my facts regarding the cause of death, which to-day I am satisfied is due to *dynamic apoplexy*.

The microscopical specimens of brain sections of David Hampton, which are shown herewith, demonstrate rupture of many blood vessels, both in the cerebrum and cerebellum. These are not the only proofs that point towards the great dynamic power of the current to rupture the blood vessels in these organs of the body, but other organs, as the liver, etc., give evidence of crushed red blood cells, etc.



CEREBRUM.

CEREBELLUM.

FIGS. 1 AND 2.—MICRO-PHOTOGRAPHS OF BRAIN SECTIONS OF DAVID HAMPTON, WHO WAS EXECUTED BY ELECTRICITY AT SING SING, JANUARY 28, 1895.—THE LESIONS CAUSED BY THE CURRENT ARE SHOWN BY THE DARK STREAKS RUNNING DIAGONALLY IN THE MIDDLE OF EACH ENGRAVING.

I also give the notes of the post-mortem on David Hampton made by Dr. Aug. Goelet, January 28, 1895, at 11:53 A. M., which show that extravasation of blood in large quantities was found throughout the entire body. This is another evidence which points toward the cause of death, which I have termed dynamic apoplexy. Dr. Goelet's post-mortem notes follow:

The body was placed on the table for examination. The superficial veins of the extremities, especially those of the arms, were empty and collapsed. Incision of the scalp and through the skin of the chest-wall showed that all, or nearly all, of the blood in the body had been driven into the head and

upper part of the chest and neck, and that rupture of the over-distended vessels had allowed extravasation of blood to take place into the cellular tissues of the scalp and under the skin covering the upper part of the chest, especially near the neck. Here the extravasated blood appeared to be congealed. In marked contrast with the condition of affairs in this location, incision through the abdominal wall showed the tissues to be almost bloodless. Incision into the tissues under the location of the leg electrode showed the same bloodless condition. On removal of the skullcap, and puncture of the *dura mater* (membrane lining the interior of the skull and enclosing the brain) a great quantity of dark blood escaped, showing that there had been an extravasation into the cranial cavity. This was found to be due to the rupture of the blood vessels. This blood coagulated, but not firmly. A specimen preserved remained fluid and unchanged for days, except that the color became brighter. It was estimated that at least two quarts escaped from the scalp and cranium in removing the brain. On removing the *dura mater*, the vessels on the surface of the brain were seen to be distended and there was evidence of rupture in many places. The same condition prevailed throughout its interior, and congealed blood was found at the base of the brain, a condition incompatible with either consciousness or life.

On opening the chest cavity, the lungs appeared normal, but extravasation of blood had taken place into the lung tissues at the upper part.

The heart-walls were thin and flabby; the blood retained in the cavity was dark.

On opening the abdominal cavity, the vessels of the intestines, especially those of the small intestines, were distended with blood. The liver was normal but engorged with blood. The kidneys and spleen were normal. The abdominal aorta was empty.

From this proof we must at least change the opinion founded only upon the non-lethal doses of the current received by certain unfortunate ones who were resuscitated by the method of artificial respiration of D'Arsonval. His belief is that it is not the heart but rather the respiration which fails. So much more then does he help to prove that in lethal doses of electricity where such a dynamic breakage in the blood vessels occurs, an immediate death is resultant by severe hemorrhages in the brain and elsewhere. Respiration is stopped almost instantly. Professor D'Arsonval would not be correct in his declaration that criminals as electrified according to our State laws were put to death by the surgeon's knife on the post-mortem tablet, and that the shocks from the current had only rendered them insensible, and that they may be revived by his method. But this is out of the question when we consider the voltage and amperage given to such a victim; and the certain proof of pathological and microscopical assurances already given us. No human subject or other animated subject could be revived if he be made to drown in his own carcass from the effects of dynamic breaking of blood vessels in every part of the internal machinery.

With all regard for Professor D'Arsonval, I cannot on the other hand deprecate his teachings, that artificial respiration should be practiced in accidental cases. Artificial respiration should be taught to every electrical engineer, so that first aid might be rendered to a partially electrified man.

I introduced in 1888 my artificial method by means of tube and bellows and oxygen gas attachment to the profession, which yielded the best of service for this method of artificial respiration. The ELECTRICAL REVIEW gave in detail—several months ago—my report of three cases who were resuscitated by this means from asphyxiation by illuminating gas. Such an apparatus should be placed in all electric stations ready for any such person receiving an accidental non-lethal dose of current. Other methods for preventing such accidents have been spoken of and recommended by others, and much attention should be paid to this matter.

I here simply want to call attention to this fact of the cause of death which cannot be disputed upon such crucial evidence elicited from microscopical and pathological lessons. My main object in bringing these points again to light is to dispel from the public and scientific mind the idea that the surgeon's knife is the executioner. Nevertheless, we must extend to Professor D'Arsonval our thanks for his teachings in non-lethal doses of electricity when received from accidental causes.

The Bonta Telephone Patents.

TO THE EDITOR OF ELECTRICAL REVIEW:

Under date of April 13, one of your contemporaries published an article on the Standard Telephone Company, of New York, which is interesting, but not news to many of us.

In closing the article, they state that they have learned that, amongst other patents owned or controlled by the Standard Telephone Company, are the well-known Bonta patents, which include his method patent No. 361,124 on the make and break system.

We must take exception to this statement, as each and all of these patents, some 16 in number, are owned absolutely by the M. & B. Telephone Company, of Philadelphia. We do not think for a moment that the Standard Telephone Company intimated in any way that they owned the control of these patents, but we feel that the journalistic enterprise displayed by your contemporary should be in a measure checked.

Where they got this information (?), we, of course, do not know, but as we consider that these patents, together with the new construction patents which are pending or allowed, give us a complete non-infringing system, we naturally desire that the erroneous impression, that the patents are owned by others, should be corrected.

In this before-mentioned article an interesting description of some of the Bonta patents is made, and, amongst others, a description of the Bonta receiver is given.

It may not be out of place to tell something of the history of these patents. It was only after a long and crucial test of the apparatus that the Patent Examiner acknowledged that Bonta had a make and break telephone, and granted a broad method patent, which was the only one ever granted to any one but Bell, and would have made Mr. Bonta and his associates very healthy competitors of the Bell company, had it not been that the Bell receiver was the only instrument of its kind. The trouble with the Bonta receiver seemed to be that it would not receive; and although Bonta's transmitter was above reproach and excelled anything made by the Bell company at that time, yet as long as the only receiver was owned by the Bell company, they held the key to the situation. In 1892 all of these patents were purchased by some Philadelphia gentlemen, who foresaw their value, and who have lately organized the M. & B. Telephone Company, of Philadelphia.

Wonderful improvements have been made since the first crude instruments were turned out years ago, and new forms on which broad construction patents are pending or allowed, give them an instrument which is superior to anything else on the market.

In connection with these non-infringing telephones, the M. & B. Telephone Company have arranged to handle what is considered the only non-infringing switchboard manufactured, and so are prepared to put in a complete system. You will, therefore, understand that the M. & B. company object to having it stated that their patents are the property of some one else. Truly yours,

M. & B. TELEPHONE COMPANY.
Philadelphia, April 19, 1895.

The Boston Subway.

The Common Council of the city of Boston met on the evening of the 11th inst. and put itself on record as favoring the construction of a subway through the Common by a vote of 41 to 11. Regardless of the fact that the subway act has been passed, the contract for its construction awarded and work already begun, there is a strong sentiment among the people of Boston that the subway will not fill the requirements of rapid transit, and that they are being saddled with a $5,000,000 expense without receiving proportionate advantages. There is no doubt the citizens of Boston want rapid transit, and want it badly, but there seems as little probability of their getting it, as there was a year ago. The subway may be a step in the right direction, but it is only a step, and from all accounts is likely to be a costly one. Some more comprehensive measure than the proposed subway must be undertaken before any real advantages can be felt, and this idea seems to be pretty well grafted on the public mind. A system of elevated roads is what is really needed—not the Meigs system, but one electrically equipped and capable of handling the traffic along the main arteries of travel. Those being relieved by an elevated road, the West End company could handle the rest to good advantage, and the "congestion" we hear about and see, and what is worse, experience daily, would be relieved.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.

RESOLUTIONS ON THE DEATH OF GEORGE M. PHELPS.

The regular monthly meeting of the Council was held at 26 Cortlandt street on April 17. Nine associate members were elected and eight associates were transferred to full membership. Mr. Geo. A. Hamilton was elected treasurer for the unexpired term of the late treasurer, Mr. Geo. M. Phelps.

At the meeting of the Institute in the evening, President Houston officially announced the death of Treasurer Phelps with fitting remarks regarding his services in behalf of the Institute.

Mr. W. J. Hammer, chairman of the special committee appointed by the Council, made the following report, which was accepted with a rising vote:

The Council of the American Institute of Electrical Engineers, desiring to express its sense of the loss to the Institute in the death of George May Phelps, at its meeting held Wednesday afternoon, April 17, 1895, at the Institute headquarters, appointed a special committee of three to draft suitable resolutions, which the undersigned, as committee, respectfully present herewith.

Resolved, That, in the death of George May Phelps, the Council has suffered the loss of an energetic, faithful and capable member and the Institute a most efficient officer; one who was constantly striving to uphold the standard of its work; one who was ever watchful of its welfare. In his disinterested efforts to serve the Institute, he brought to bear upon its deliberations, his keen perceptions, intellectual ability and eminent force of character.

Resolved, That a copy of this resolution be suitably engrossed and framed and presented to Mrs. George W. Graham, his daughter and the sole surviving member of his family.

(Signed) WILLIAM J. HAMMER,
JAMES HAMBLET,
RALPH W. POPE.

A paper by Prof. E. J. Houston and Mr. A. E. Kennelly upon "Resonance in Alternating Current Lines" was read by Mr. Kennelly and discussed by Mr. Bradley, Dr. M. I. Pupin and Prof. A. G. Webster. A paper was also read by Prof. W. A. Anthony on "Underwriters' Rules," which was discussed by Messrs. Hammer, Leonard, Woodbury, Jenks, Holmes, Mailloux, Ayer and Hamblet. A communication from Mr. Fremont Wilson was also read. On account of the lateness of the hour, the final discussion of this paper was laid over until next meeting.

KIND WORDS.

HE WANTS IT EVERY WEEK.

TO THE EDITOR OF ELECTRICAL REVIEW:

I am very much pleased with your publication and shall become a regular subscriber.

Yours respectfully,
E. P. KIMBALL.

April 13, 1895.

A petition has been granted by the city government of Portland, Me., to a new telephone company, which proposes to furnish telephones to local subscribers at reduced rates.

AUTOMATIC TELEPHONE EXCHANGE.

CONSTRUCTED BY MESSRS. DECKERT & HOMOLKA, OF PRAGUE.

Although in constant operation ever since the year 1887, little or nothing has been known in the United States about the automatic telephone exchange constructed in Prague by Messrs. Deckert & Homolka.

As a rule an automatic exchange is supposed to be the *ne plus ultra* of promoters of new telephone companies. Sound this watchword, and there is at once a royal road to the

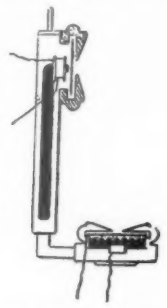


FIG. 1.—COMPOUND TELEPHONE.

tightly drawn purse-strings of close-fisted capitalists. Somehow the mere mention of an automatic exchange charms before the eyes of the uninitiated people a huge electrical apparatus which effects the various complicated movements of switchboard operators with the rapidity of a lightning stroke and the unfailing precision of a modern prestidigitator like Herrmann.

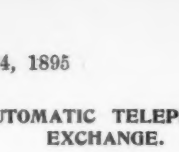


FIG. 2.—AUTOMATIC HOOK.

I think it was our noble Channing who wrote in a letter that the only great sorrow of his life had been the "immense discrepancy between his conception and his practice of right." With a slight variation from the original text, it may truthfully be stated that the great sorrow of the capitalists who have so far invested in automatic telephone exchanges has been the "immense discrepancy between their conception and the commercial or practical results."

In the United States the technical papers have recently teemed with descriptions of automatic telephone exchanges, but a mere glance at the illustrations of the apparatus convinces even the laymen that such a highly complicated organization of electrical devices, besides being exceedingly costly, requires almost as much supervision as a modern multiple switchboard, while the saving of operators' salaries, though apparently a very important item, is offset to a great extent by the necessity of giving each subscriber as many conductors as there are stations attached to the automatic switching apparatus.

I do not wish to be understood that I underrate the efforts of telephone electricians aiming to solve this knotty problem. On the contrary, any one who has even the slightest understanding of the difficulties which must be overcome in order to create such a system, cannot fail to admire the hardihood of those men who stand forth as the pioneers in this branch of applied electricity. Human intelligence, combined with mechanical skill, is constantly conquering new fields, and there is no doubt that after repeatedly vain efforts an automatic exchange system will be developed, thoroughly efficient for a limited number of people.

At present I know of no automatic telephone system which is reported as giving such general satisfaction as that mentioned in the introductory remarks, and for this reason I believe that a description of Messrs. Deckert & Homolka's installation will be welcomed by the readers of the ELECTRICAL REVIEW.

A glance at Fig. 5 reveals the fact that there must be as many line wires as there are stations and a common return wire.

For practical purposes the conductors are bunched together into a cable, special care being taken to prevent inductive effects between the several conductors.

For convenience, we will assume that there are but three stations in the entire system (see Fig. 3).

In it S_1 S_2 S_3 are alarm bells; t_1 t_2 t_3 keys, each having an upper and a lower contact point; a_1 a_2 a_3 automatic hook switches, carrying a compound telephone (see Fig. 1). The letter being on the hook (its normal condition) the current is open at c_1 c_1, c_2 c_2 and c_3 c_3, respectively. In the drawing, T_1 M_1, T_2 M_2, T_3 M_3 represent the compound or micro-telephones.

Fig. 3.

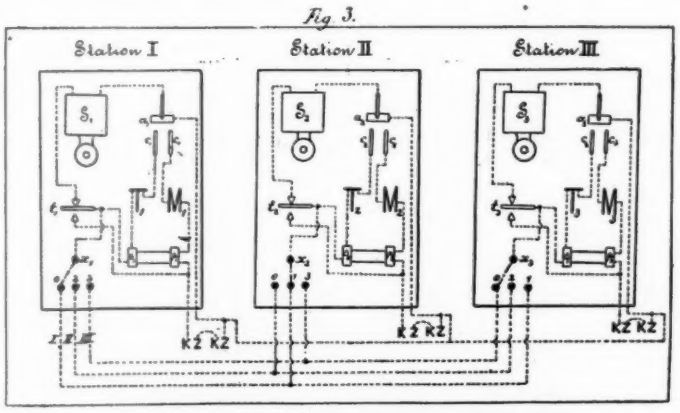


FIG. 3.—DIAGRAM OF THREE TELEPHONE STATIONS.

Looking at Fig. 2, it will be noticed that the weight of the telephone draws down hook h but raises its end a_1, thus closing the contact with the upper spring. s_1 p_1, s_2 p_2, s^3 p_3 are inductoria, having a primary and secondary coil. 0, 2, 3—0, 1, 3—0, 2, 1 are contact points over which move

Fig. 4.

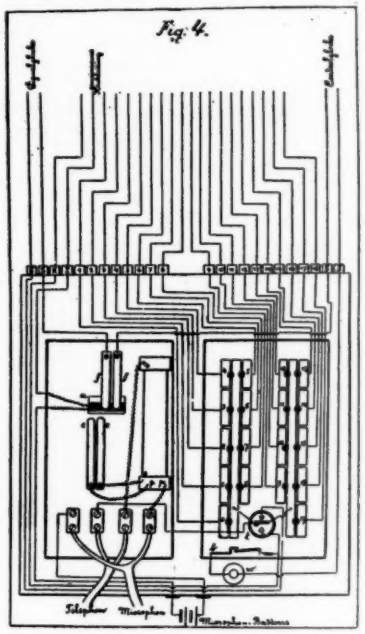


FIG. 4.—AN INSTALLATION FOR EIGHTEEN TELEPHONE SUBSCRIBERS.

switches pivoted at points x_1 x_2 x_3, respectively. K Z are Leclanché batteries, and, as a rule, five elements are needed for a subscriber's station.

Fig. 5

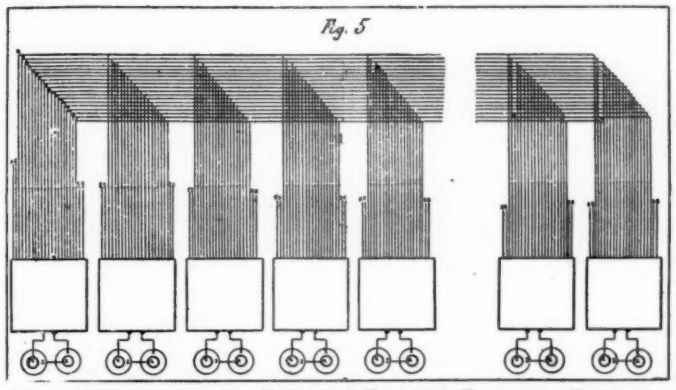


FIG. 5.—WIRING DIAGRAM OF DECKERT & HOMOLKA'S TELEPHONE EXCHANGE.

They serve for the energization of the microphones and the ringing of alarm bells. Fig. 3 is a systematic drawing of the circuits.

Prior to examining the various circuits, it should be noted that only the calling subscriber needs to turn his switch. Assuming station II desires to call station I, the subscriber at No. II places his switch on point I and then presses the key t_2.

A circuit is now closed from K at station No. II through the lower contact of key t_2, thence through point I, line conductor 1_1 o_1 x_1 t_1 S_1 a_1 the common return wire to Z.

In other words, the bell at No. I rings. The subscriber being thus notified gives a return signal by pressing key A_1, ringing the bell S_2 at station No. II. Thereupon both parties remove the micro-telephones from their respective automatic switch hooks and are ready for oral communication. The circuit is as follows: Starting from K the current flows through the primary of p, the microphone M_1 c_1 a_1 to Z; the induced current in S passes through T_1—c_1—a_1, the common return, to station No. II + a_2 — c_2 + T_2 — s_2 through the switch lever to point 1 of line I, returning by x_1 to s_1.

The circuit of the primary of the inductorium at II is closed by the removal of the telephone; in other words, the two parties may exchange conversation.

At the close of their communication, the parties replace the telephones, thus breaking contacts between points a_1 and c_1 c_1, and a_2 and c_2 c_2, closing at the same time the ringing circuits.

In Fig. 4 is illustrated an installation having 18 subscribers. Of course, branches from each line must be introduced into each subscriber's station, *i. e.*, instead of three contacts, as in our prior illustration, there will be 18.

Nominally, a plug is inserted in o. When a subscriber calls, the current enters at I, passes through o, which, by means of the plug, is connected to the middle brass bar, thence through key t, which rests against its upper contact point, to the bell, left spring f, a, and the common return. As a matter of course the plug at the calling station should have been inserted into the hole representing the desired subscriber. As it is imperative, when a conversation is finished, to remove the plug at the calling station and to place it into its normal position, *i. e.*, into o, the inventors have provided in a local circuit, consisting of spring f, an alarm bell and a spring b, below plug o. This local circuit is connected to the main battery by a branch line. In this circuit there is also a resistance coil of 30 ohms, which serves to prevent the useless expenditure of the main battery current. This "control" alarm rings as long as the microphone is on the hook, but the plug remains in any other hole excepting the one marked o. The removal of the micro-telephone interrupts the circuit between a and spring f, thus silencing the control alarm bell. It will be observed that by placing the plug into the hole marked o, the circuit is interrupted at b. Although it has been pointed out before in describing the circuits for three lines, it may be well to repeat that only the calling subscriber changes the position of the plug prior to ringing the desired party, while the called station simply gives a return signal and then removes the telephone from the automatic switch hook.

This system, which offers very little complication, has worked admirably well in Prague ever since 1887, and there seems to be no reason why it should not give complete satisfaction to a limited number of subscribers.

VICTOR M. BERTHOLD.

Advantages of Electric Fire Alarms.

The complete destruction of the Crocker-Wheeler Electric Company's factory by fire, involving a loss of $250,000, which in this case fortunately falls upon the insurance companies, is another instance of the inefficiency of a watchman for the protection of factory buildings, and again demonstrates the value of an automatic fire alarm system which will bring the fire department promptly on the scene. The first few moments after the outbreak of a fire is the critical time in deciding whether or not it can be got under control, and upon the prompt arrival of the apparatus often depends the salvation or destruction of the entire plant. While a watchman may be thoroughly conscientious and alert and do everything in his power under the trying circumstances which confront him, the appliances at hand are necessarily limited and one man is seldom enough for the emergency. If after doing all he can he finds the fire too much for him to handle, and must then leave it to send in an alarm, much valuable time is lost, and when the apparatus finally arrives the blaze has obtained a vantage ground which often means the destruction of the property. With the splendidly developed electric fire alarm systems which are on the market at the present day, affording every possible means of protection, and at the same time reducing the insurance premiums very materially, it seems decidedly short-sighted policy to pass them by, and still depend on the by no means infallible vigilance of a human machine which, however good it may be, still has weaknesses which the other is not heir to. The automatic fire alarm companies have made immense strides in the improvement of their systems during the past few years, and as their business has increased through the gradual appreciation of its merits, they have kept abreast of the requirements presented and meet them at every point. The insurance companies have not been slow to recognize the additional protection to themselves, as well as to the manufacturers, and have offered inducements in the shape of reduced premiums on plants so equipped. The manufacturer whose plant is destroyed by fire, even though he be insured, suffers a loss which can hardly be estimated at the time, and from which it may take him years to recover, and though it is a peculiarity of human nature to look on such a contingency as applicable to everybody but himself, the sensible man is the one who leaves no dangerous point unguarded, especially against so ruthless an enemy as fire.

Where the Profit Lies.

CUSTOMER—You tell me this motor costs you $580 and yet you offer to sell it for that figure?

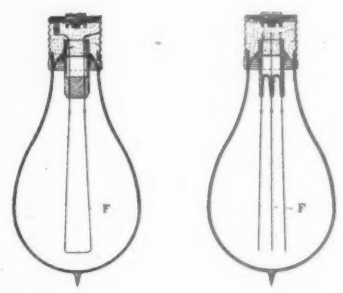
SALESMAN—I do.

CUSTOMER—How then can you make any profit on the sale?

SALESMAN—We don't, but we hope you'll give us your orders for repairs.

A Multi-Filament Incandescent Lamp.

Mr. C. A. Merritt, of Birmingham, Ala., is the inventor of a novel incandescent lamp which is made with three or more filaments. According to the inventor, they may all be of the same candle-power, or have different degrees of illumination. Each one is to be used separately, or two or more can be used at the same time in multiple arc. One terminal of the carbons is attached to a contact post. In the base of the lamp the other leading-in wires are attached to the outer shell for a return contact. The contact posts for each filament are insulated from each other, and are touched by a switch which also forms a contact with the key in the socket. There is no change necessary in the socket from present construction. By placing the pointer end or switch on any contact post, the carbon connected with it will be lit up, or by



MERRITT'S MULTI-FILAMENT INCANDESCENT LAMP.

turning the broad end around, one or all may be lit up. It is said that this lamp can be made at a slight additional cost over the regular lamp.

Mr. Merritt thinks that the true way to use this lamp would be to burn each carbon for about 300 hours. With four filaments this would make, say, 1,200 hours continuous use, at a comparatively small loss of brilliancy, while each filament might drop 10 to 15 per cent in burning. Every time a fresh one is started it would bring up the lamp to full candle-power. That is to say that in using the lamp before the globe becomes smoked enough to obscure the light the initial brilliancy will be restored as many times as there are extra carbons to use.

A New Electrical Company in Cleveland.

The Adams-Bagnall Company, of Cleveland, Ohio, has been incorporated by Edward Adams, of the Brush Electric Company; E. J. Bagnall, of St. Louis, who was with Mr. Brush when the latter's present plant was built; C. G. Hickox, George W. Howe and F. H. Cobb. The company is capitalized at $150,000 and the stockholders are all Clevelanders. It will manufacture electrical apparatus. The company will buy or build a plant, but the site has not yet been even discussed.

Assistant General Manager Holmes, of the Chicago Edison Company, visited New York last week.

Canal Water Powers in Arizona.

A correspondent in Phœnix, Arizona, informs the ELECTRICAL REVIEW that the Rio Verde Canal Company intend to utilize the water power of their canal, when it is completed, for the generation of electric current. There will be three or four power stations along the canal line which will be capable of furnishing, at an ordinary flow, something over 7,000 horse-power. The first power house will be built about three miles from the Union mine, nearly 18 miles north of Phœnix, and will furnish of itself about 4,000 horse-power, the entire waters of the canal making a fall of 47 feet at that place.

It is said that other canal companies in Arizona have similar opportunities for utilizing their water powers, which are now going to waste. It is believed that the example set by the Rio Verde Canal Company will exert a progressive influence on others and that by a judicious investment in plants and a proper application of the power generated, the prosperity of the territory will be materially increased and the promoters of the enterprise will receive their rewards in the form of handsome dividends.

Mr. Charles N. Black Promoted.

Charles N. Black, of Cleveland, O., has just been appointed superintendent of the works of the Brush Electric Company, of Cleveland, in place of C. W. Phipps resigned. Mr. Black is a graduate of Princeton College. The last two years of his course were devoted to electrical engineering under Professor Brackett. As soon as he finished his college career, he took a trip through Europe and then entered the shops of the Brush Electric Company as an ordinary workman. He has had experience in every department and was at one time at the head of various departments, such as the drafting-room and testing-room. The design and construction of the large Brush arc dynamos Mr. Black had charge of, and in connection therewith was thrown into frequent consultation with Mr. Brush. Mr. Black is eminently qualified for the superintendency of the manufacture of electrical apparatus, and the ELECTRICAL REVIEW wishes him the best success in his new position.

Cutting Names on Metal.

TO THE EDITOR OF ELECTRICAL REVIEW:

I note in the current issue of the ELECTRICAL REVIEW an inquiry regarding the use of storage batteries in connection with a machine for cutting names on metal.

We can furnish the batteries to drive a drill which, I judge, will do the work required.

I shall be much pleased to furnish such further information as you may desire.

Yours very truly,

CHAS. BLIZARD,

Manhattan Electric Storage Battery Company.

New York, April 17, 1895.

An Amateur Incandescent Electric Lamp of 1876.

Mr. F. J. Kingsbury, Jr., of Bridgeport, Conn., writes as follows to the *Maine Sportsman*, of Bangor:

BRIDGEPORT, CT., February 13, 1895.—Your article, Vol. II, No. 17, January, 1895, page 5, called "Fishing by Electricity," which is spoken of as "the new form of sport," rather interested me. Some time ago in looking over some old copies of the *Scribner's* monthly magazine, I came across the following item, Vol. XII, No. 2, June, 1876, which shows that the Prince of Monaco's idea is not entirely a novel one and also that the incandescent light was of an earlier practical benefit than most of us supposed.

"A platinum wire inserted in a glass bottle and then connected by insulated wires with a battery has been employed as an 'electric fish bait' in shallow waters. The bottle is sunk in the water just above a snap net, and when the battery is applied the wire glows and gives a bright light that attracts the fish and when the net is sufficiently covered it is suddenly closed and all the fish within reach are secured."

Beware the Capitalist!

A machinist who dropped into our office the other day and was asked how he was getting along with the new machine he has invented and is trying to develop, says the *American Machinist*, replied that he was troubled with a drunken capitalist and was making no headway whatever. He explained that a wealthy man who had agreed to put up the money for an experimental plant, had been on a prolonged spree which seemed likely to be continued indefinitely, and things were in such shape that nothing could be done. It is evident that there should be a general agreement amongst mechanics not to employ drunken capitalists.

LITERARY.

A paper on "Journalism," by Charles A. Dana, editor of the *Sun*, with a new portrait of the author, will appear in *McClure's Magazine* for May.

The question that is agitating the transportation world at present is, "Will the Electric Motor Supersede the Steam Locomotive?" The consolidation of many short-line electric roads into longer systems connecting great cities has progressed so rapidly that the steam railways have begun to feel the competition. Joseph Wetzler, editor of the *Electrical Engineer*, discusses this question in the May *Scribner*.

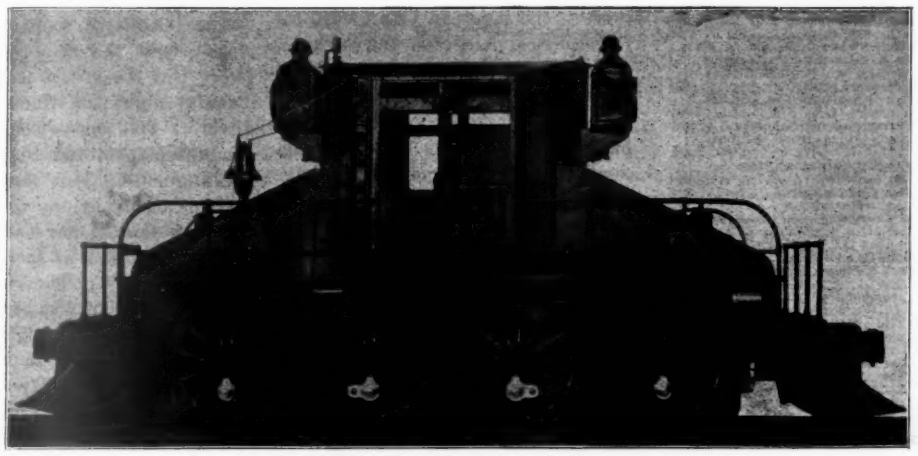
"The Electrical Engineer."

The death of Mr. George M. Phelps has necessitated a number of changes in the office of our esteemed contemporary, the *Electrical Engineer*. Mr. T. C. Martin has been elected president of the corporation, Mr. Joseph Wetzler vice-president and treasurer, and Mr. A. C. Shaw secretary and business manager. Mr. A. C. Boughton will assist in the business management of the paper, and Mr. Shaw will still continue in charge of the Boston office.

THE SPRAGUE ELECTRIC LOCOMOTIVE.

A SIXTY-SEVEN-TON LOCOMOTIVE FOR EXPERIMENTAL WORK IN HANDLING HEAVY FREIGHT.

The illustration on this page shows an electric locomotive just completed at the Baldwin Locomotive Works after designs by Messrs. Sprague, Duncan & Hutchinson, of New York. For the illustration and the following particulars we are indebted to the *Railroad Gazette*. It is intended for special experimental work in handling heavy freight and in switching, and was built for the North American company for this purpose. The locomotive resembles somewhat the ordinary consolidation type used for heavy freight-yard work. There are four pairs of drivers coupled together by quarter-cranked connecting rods. The frame and the superstructure are symmetrical and the former is provided with freight buffers and iron pilots. The pedestal boxes are a special form made of cast-steel and project inward, forming the brackets



SPRAGUE SIXTY-SEVEN-TON ELECTRIC LOCOMOTIVE.

which carry the motors. The lower sides are arranged to be dropped out, so that the brasses can be readily replaced in the usual manner. These boxes are very large and heavy and perform the duty of carrying both the axles upon which the armatures are rigidly mounted and the field magnets concentric to them. A stirrup projects from the upper part of each to engage the middle section of inverted elliptical springs. There are four sets of springs arranged on the double three-point suspension system. In this way the whole superstructure is carried on equalizing springs. The drivers are 56 inches in diameter, the end ones only being flanged.

The motors, four in number and alternating in position, are the "Continental" ironclad type, the field magnets, consisting of two steel castings, having two field coils placed at the ends of the motors, thus forming two consequent and two salient poles. The magnets are compound wound. The armatures, which were built by the Westinghouse Electric and Manufacturing Company, are of the slotted type. The motors are wound for 800 volts at 225 revolutions, which equal about 35 miles an hour when in multiple. About 250 amperes of current will be used, and, at 93 per cent efficiency, each motor will give about 250 horse-power. There will be a constant drawbar pull of over 10,000 pounds. To effect the prompt operation of the controlling system, compressed air from the air brake tanks is used. It is kept at a constant pressure by a special electric pump. The cab is provided with ammeters, voltmeters, whistle, bell, headlight, etc. The American driver brake is applied to every wheel. The cab, as seen from the illustration, is centrally mounted with wedge-shaped ends and forward-inclined sections running down to each end of the locomotive. The controlling apparatus in the cab is so arranged that the engineman sits at the right side looking forward, no matter which way he is normally running.

The total weight of the engine is about 134,000 pounds, equally distributed upon drivers. It is at present standing in the erecting shops of the Baldwin Locomotive Works, where it has been tested by Dr. Duncan and Dr. Hutchinson. It is possible that it may be taken to Baltimore for actual work in the near future.

Now that the Union Electric Company and the Seattle Gas and Electric Light Company have consolidated under the name of the Union Illumination Company, of Seattle, Wash., arrangements have been completed for the consolidation of the larger electric light plants, the plant at the corner of Sixth and Olive streets and the one at the corner of Fifth and Jackson streets being moved to the power house on the Grand street bridge. This change has been talked of for some months, but was not considered feasible until the consolidation of the two light companies took place.

New stockholders, by recent purchase at trustee's sale, have reorganized the Taylor, Texas, Electric Light and Power Company. The following new officers have been elected: Hugh Burns, president; B. Garry, vice-president and general manager; F. L. Welch, secretary and treasurer. A new charter for the corporation has been applied for and considerable improvements will be added to the plant.

OUR BOSTON LETTER.

Mr. Henry F. Kellogg, so long and favorably known in connection with the Whitney Electrical Instrument Company, has recently severed his connection with the above concern and associated himself with W. B. Southgate & Company, of this city, an enterprising young firm of general manufacturers' agents. Mr. Kellogg in his new connection will continue to handle the Whitney electrical instruments in this and other territories, in addition to the line of specialties already controlled by the firm, and as his acquaintance in the trade extends from Maine to California, he will prove a valuable acquisition to the firm with which he is now identified.

An evidence of the improvement in business circles generally and in manufacturing particularly, is found in the report from the Dodge Manufacturing Company, of Mishawaka, Ind., that they are busier now than at almost any time in their history. This concern is one of the largest, if not the largest, manufacturers of power transmission appliances in the world, and through them the pulse of the manufacturing industry of this country can be felt. The New England headquarters, under the management of Mr. Frank H. Underwood, are doing a splendid business and some particularly important contracts have recently been closed.

The Dynamo Electric Maintenance Company, of this city, whose entrance into the electrical field about the first of the year was, as our readers will remember, the cause of an unusual, or rather an extraordinary blare of trumpets on the part of Insurance Commissioner Merrill, has reached a wonderful degree of development during the past few months, and the rapid growth of their business, as well as the favor with which their enterprise is viewed by numbers of the representative electrical men of the country, has demonstrated thoroughly that their ideas were based on a sound knowledge of the requirements of the situation. One of their late announcements contains the names of over 50 prominent concerns in this section with whom contracts for the maintenance of their apparatus have been closed, among them being such plants as the Lowell Electric Light Corporation, of Lowell, the Woonsocket Electric Machine and Power Company, of Woonsocket, R. I., the Franklin Electric Light Company and some of the largest estates and business corporations in Boston and vicinity. Nor has this activity been limited to this section of the country, branch offices having been opened in New York and New Jersey, and others being in contemplation. Their advisory board has been augmented by such well-known names as William D. MacQuesten, Albert E. Herrick and James Burke, consulting engineers of New York, whose reputation in matters electrical is well known. All this goes to show that the purpose for which the Dynamo Electric Maintenance Company was organized is appreciated by owners and users of electrical apparatus, as we predicted it would be, and as their prompt acceptance of it proves conclusively.

H. G. T.

Boston, April 20, 18 5.

The Carbonnelle Microphone.

Referring to an article published in the ELECTRICAL REVIEW, February 20, 1895, concerning the Carbonnelle microphone and its great efficiency both on long and short lines, we now take pleasure in publishing the contents of a letter, recently received by us from M. J. Banneux, the well-known chief of the Belgian Telegraph administration, a gentleman whose opinion carries great weight:

The Carbonnelle microphone consists chiefly of two carbon disks with carbon granules between them. The characteristic feature of the instrument is its extremely high resistance, amounting to several *million* ohms; its resistance varies also within wide limits. A common or centralized source of electrical energy is employed for a large number of transmitters. As to the tests which have been reported in several electrical journals—and referring here especially to those carried on recently over one of the Anglo-Belgian cables, they have not, in my opinion, proved the superiority of the Carbonnelle system over transmitters, such as the Hunnings, solid back, Grünewald, etc. It will need more complete and exact tests to prove the claims of superiority for the Carbonnelle microphone, and, for this reason, I desire to reserve my final judgment concerning the merits of the system, which, in reality, is one of the first circuit arrangements employed in telephony.

J. BANNEUX.

The "Street Railway Gazette."

Mr. W. J. Johnston informs the ELECTRICAL REVIEW that he has purchased the *Street Railway Gazette* with all its assets, and that hereafter it will be issued from his office. Mr. Clarence E. Stump, general manager of the paper, and Mr. J. W. Dickerson, the editor, will still be connected with it. The paper was established in 1886 as a monthly, but became a weekly in 1892. The size of the paper will be decreased and the number of pages increased.

New York Electrical Society.

A meeting of the New York Electrical Society will be held at Columbia College, Forty-ninth street and Madison avenue, this evening at 8 o'clock.

Mr. Edward Durant will deliver a popular lecture on "The Manufacture by Means of the Electrical Furnace of Diamonds, Rubies, Aluminum and Calcium Carbide (Acetylene Gas.)"

The earlier stages of each production will be experimentally demonstrated by simple apparatus, and actual products will be shown.

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The business situation in industrial circles continues to improve at a gratifying rate. It is good opinion that prices will steadily advance and that the era of depression has become a matter of history. The returns from Western Union test offices show that business is reviving. There is no better index of the situation than the number of telegraph messages handled.

THE NEXT MEETING OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION.

The next meeting of the National Electric Light Association will be held in June, 1896, and, it is hoped, in New York city. But two meetings of the association have been held in New York—one in August, 1885, and the other in August, 1888. It is the general opinion that New York deserves to get the meeting in 1896, and it seems quite probable that this will be the case. The association can do itself lots of good and perhaps add considerably to its bank account if the plans now being quietly discussed by a few earnest workers are brought to fruition.

The advantages of New York as a convention city are almost innumerable. June is one of the pleasantest months in this latitude. At that time of the year the many places of amusement are still in full blast, Riverside Drive, the Central Park and other green places are looking lovely, and Coney Island will be in working order. The hotels of the city will not be overcrowded with tourists and the finest accommodations in the land can be provided for the electrical delegates. We can show them the largest low tension system of electric lighting in the world, the only overhead trolley system on Manhattan Island and, we expect, a successful underground electric railway on Lenox avenue. We can entertain the ladies royally by driving them to the Metropolitan Museum of Art, where one of the finest collections of pictures in America is on view, and we can take care of them in many ways, morning, afternoon and evening, so that the gentlemen will have ample time to attend to business and other things.

We believe that the electrical interests of New York city can provide an entertainment fund which will be sufficient to make every minute of the convention a lasting delight and a topic for grateful reminiscence.

The place to hold the business meetings is the Grand Central Palace on Lexington avenue just alongside the Grand Central station. No better facilities than are here provided can be found and the management is especially liberal and friendly to electrical men. It has also been suggested that a grand electrical exhibition lasting a month or more be held in the Grand Central Palace, and that the American Street Railway Association be urged to hold its annual meeting in 1896 during the exhibition. This would enable the two associations to provide a representative exhibit that would be well worth visiting both by electrical people and the general public. In the building named there is plenty of space for a miniature World's Fair, there are freight elevators of unusual capacity and arrangements can readily be made for transferring exhibits directly from the cars of the New York Central road to the building. There is an ample supply of current for all kinds of apparatus. It has also been suggested that it may be possible to have a working electrical exhibit driven by motors operated by current directly from Niagara Falls.

WALL STREET AND THE ELECTRICAL STOCK MARKET.

Wall street enjoyed a strong bull market all the week. The better feeling is based upon a more general activity in the various branches of industry and attendant higher prices for raw materials. Up to a recent date and for 18 months back the markets for staples have been in buyer's favor. Prices have sagged and sagged until there seemed to be no bottom. This is all changed now. Owing to absorption of stocks and necessities of consumers, holders are asking higher prices. As is always the case after a long period of depression, this is stimulating business. Its effect upon Wall street has been magical. A general business revival is a long way ahead, but it is in sight and is not too far off for Wall street to discount. This is why there has been a good demand for securities and a gradual broadening of the market. Conservative houses are inclined to counsel moderation. Nevertheless, they agree that the market is on the up track and that it will at least retain its rise of some 5 points made since the adjournment of Congress.

The electrical controversy has closely held the attention of Wall street this week. It seems that on Tuesday night the General Electric directors met and discharged their committee appointed to confer with Westinghouse. This was made the basis of attack by one of the dailies against a news agency which had kept its readers posted as to the progress of negotiations. The charge was rather vague, but was in effect that the agency in question had been used to disseminate reports to further stock jobbing operations. My information is that the speculating was on the part of some of the officers of General Electric. As stated in my last report the stock was not sufficiently distributed to satisfy certain interests and they in consequence called the deal off. Their favorite organ virtually admitted as much in the statement that there was still a possibility of something resulting from a deal between the two companies, thus paving the way for further negotiations when the stock ownership is satisfactory to all interests. Since the publication of the articles something over 60,000 shares of stocks have been traded in. It is just possible that the "further negotiations" may not be as far off as the public has been led to believe.

The low price of the stock was recorded on Thursday at 31⅞. It was forced there immediately after the publication of the articles in question. It rallied to 33¾ on Friday, opened at 33¼ on Saturday and closed at 33¾. There was undoubtedly a heavy accumulation of stock during the latter part of the week.

The annual report of the company has been completed, but will not be given out until about May 1. I am authoritatively told, however, that it will show a gross business of about $12,000,000 and a manufacturing profit of $1,811,000. Out of this amount $1,000,000 has been written

off and $500,000 paid in interest on the bonds, leaving a balance of $413,000 as applicable for dividends. The preferred stock, which is cumulative, would require for the year $295,000. There is in addition to this amount due $147,500, making the total which has accumulated on the preferred and is unpaid $442,500, or $29,500 more than the surplus. Thus it will be seen that the common stock has nothing to its credit. In addition to the amount written off as stated there is $1,000,000 written off and charged to profit and loss account, making the impairment of capital or assets (as certain stockholders choose to style it) over $13,000,000.

I am told that the Western Union company has concluded to use the electric storage battery, and that where 8,000 cells have been in use they now use 400 of the batteries and the cost is as $1.10 to nine cents per year in favor of the storage batteries. The Electric Storage company has just closed important contracts with the Bloomingdale Brothers and some large factories for the use of the batteries, thereby saving to these institutions the expense of maintaining plants at least during the night.

On the Boston Exchange, Bell Telephone weakened again. The highest price paid was 180 on Monday. The lowest 175½ on Friday. The other telephone stocks sympathized. Erie declined three points to 50 and New England two to 66. The growing competition and attendant uneasiness among stockholders is ascribed as the cause. Electric Storage Battery was unchanged, 29⅞@30. Westinghouse was stronger at 34@36 for the common and 52@52¼ for the preferred. An interesting movement was in Fort Wayne Electric, which advanced to 2 bid and 2½ asked. For months the stock was ranged around 1@1½.

Electric Traction of Philadelphia has called its final assessment of $10 per share on its capital stock, payable May 17. The penalty of default is 12 per cent per annum.

In a table following will be found the change of prices of the telephone and a few of the important telegraph and electrical stocks in a month. It will be seen that Bell Telephone reflects the organization of the Standard. Changes in the other stocks of that class show a slight sympathetic movement. In the telegraph stocks Postal has had a short advance on important changes contemplated, and improved prospects. The table follows:

	April 20		March 16	
	Bid.	Asked.	Bid.	Asked.
Bell Telephone	176	177	191	191½
Erie	50	50⅛	50	50⅛
Hudson River	38	42	40	45
Mexican	75c	85c	70c	75c
New York & New Jersey	102½	....	103	105
New England	66	66¼	68	68⅛
Ed. of New York	97	98⅛	94	96
Ed. of Brooklyn	104	106	106	107
Ed. of Boston	125	125⅛	125	125⅛
Int. Cond. and Ins.	34	37½	41	43
Commercial Cable	137	....	137	....
Gold & Stock	105	....	104	....
Postal Tel	70	74	62¼	....

BAIN.

New York, April 20, 1895.

The street car vestibule bill as amended in the Assembly so that all cars must be vestibuled by November, 1896, has been concurred in by the Wisconsin Senate.

UNDERWRITERS' RULES.

READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK AND CHICAGO, APRIL 17, 1895, BY PROF. WILLIAM A. ANTHONY.

A recent controversy, in relation to inside wiring for incandescent lighting, has suggested to me the importance of bringing out a full and free expression upon the subject from those whose experience gives them the best right to speak, and I venture to bring the matter before the Institute in the hope that it may provoke such an expression as may have some influence in determining the character of any changes in the rules for construction that may be proposed, or in fixing the interpretation to the rules now in force. The present rules are, of course, the result of a process of evolution, and I think every one will admit that the process has been one of progress. In early days of electric lighting the desire to conceal the wires led to fishing them in between floor and ceiling and between plastered walls, as had been done with electric bell and burglar alarm wires. Fires occurred and were ascribed to the electric wires, sometimes rightfully, but no doubt sometimes wrongfully.

Insurance companies took up the matter, passed rules and appointed inspectors. Many of the rules were good, some were only an annoyance to the construction companies. Different boards adopted different rules, and often the inspector was a law unto himself.

Wishing to assist in securing uniformity, and feeling that electrical engineers who have to do with the practical work of electrical installation are best qualified to frame rules for electrical construction, the National Electric Light Association, in 1890, appointed a committee to take the matter in hand, and upon the report of this committee, in 1891, adopted a series of rules which, with some amendments adopted at later meetings, may be assumed to represent fairly well the concensus of opinions among the electrical fraternity as to what constitutes a safe electrical installation.

Rules, substantially the same as those, have been adopted by the National Board, and various local boards of fire underwriters, and are the recognized rules in force at the present time.

The object of all rules is, first, to secure a safe and permanent installation; second, to provide for the repair or renewal of conductors in case of failure. It may be said that from the standpoint of the insurance companies, the first is the only object, but surely, conductors so installed that they can be easily overhauled and replaced in case leakage is discovered are safer for the very reason that a fault is likely to be repaired before any serious damage has occurred.

When highly insulated wires, whose insulation resistance was measured in megohms per mile after immersion in water for weeks, came into use for electric lighting plants, it was natural to suppose that they could be put anywhere, and would last indefinitely. They were put in all sorts of inaccessible places; on the beams before floors were laid, in partitions before plastering, on the lath with iron staples to be covered with mortar. Some such circuits are no doubt in existence to-day, as perfect in insulation as when first put up; but numberless cases of failures of insulation occurred, and experience shows that such a construction is entirely unreliable. Then came the interior conduit, which it was assumed would serve both as a mechanical protection and an insulator, but it was found not to be entirely reliable in either capacity. It was not impervious to moisture, it was subject to damage by nails, saws and chisels. It was found necessary to prescribe that wire of the highest insulation should be used in it, and that it should not be drawn in until all danger from mechanical injury was passed. Then came the brass-armored conduit; but that was not nail-proof. Now we have the iron-armored conduit, and it remains to be seen whether this will fulfill all requirements.

It has become to be pretty well recognized that no mode of electrical construction is absolutely proof against failure at some point, and that form of construction is best which affords the smallest chance for injury or depreciation, and offers the greatest facilities for repair or renewal in case of failure.

There has been a uniform progress in the direction of greater safety and better facilities for repair, from the time when wires were put anywhere, to be covered by floors, or mortar, or built into brick walls, to the iron-armored conduit which is offered today. To be sure, the cost of the installation has advanced, and the iron-armored conduit presents difficulties when alternating currents are employed. To me it seems that the advantages gained are worth the cost, and the difficulty with alternating currents disappears, if the two conductors are placed in one conduit. To this I can see no possible objection when the conduit is iron armored.

In view of the fact that we cannot be absolutely certain that failures in insulation will not occur in any given installation, it seems to me that the foundation principle of all rules for the placing of conductors should be accessibility. Further, no conductor should be placed where its position or its relation to other conductors in any part of its length is unknown. This means that raceways must be provided, into which conductors may be drawn and from which they may be removed at pleasure, such raceways to serve as adequate protection from mechanical injury; or the conductors must be placed in mouldings which are themselves accessible, or they must be supported by cleats or insulators in plain sight.

I believe that past experience would warrant the adoption of a rule that would require the use for concealed work in buildings of fire-proof construction, where conductors must be carried up steel columns, over steel floor beams, in brick partitions, or in plastered walls, of a raceway or conduit, equal in its ability to afford mechanical protection to that known as iron-armored conduit, so installed that conductors could be drawn in or out any time.

And now a word as to the controversy that suggested this paper:

A conductor has been put upon the market, which consists of a standard Habirshaw wire with its covering of rubber and braid, having woven upon it two additional coverings of extra heavy braid. This additional covering, which is tightly woven on, and from which the wire can no more be removed than from its original covering of rubber and braid, the maker, by an extraordinary stretch of language, calls a tube and claims for it the advantages of the conduit tube prescribed in the insurance rules. It goes without saying that this wire affords no means of replacing a damaged conductor, and, therefore, has not that advantage of the conduit. As to mechanical protection, it certainly is not superior to the unarmored conduit, and it has not the advantage that the conductor can be left out until the danger of injury is passed. As to insulation against moisture, the added coverings do not improve it, the insulation being entirely due to the rubber covering which is inside of all the braids.

And yet I have just learned that the New York Board of Fire Underwriters, on March 20, passed the following resolution:

Resolved, "That the superintendent be authorized, until further notice, to approve the use of the Attix tube and wire, when equal in quality and insulation to the samples submitted to this Board and tested, under the same conditions where tubing would be permitted; provided that there is no splicing or tapping of the wire, but that its introduction shall be in all cases by the loop system; that in new buildings, when necessary to carry it between floors and plastering, it shall be through holes bored in the beams, not less than two inches apart, a single conductor in each hole, out of the reach of nails; and in old buildings, where necessary to carry it within the reach of nails, it shall be protected by some device from perforation; and provided further that the wire and tube be carried intact into the cut-out boxes, and that in no case shall the outer covering be removed before introducing the core wire into the cut-out box."

It will be noticed that the wire is called a "tube and wire," when it is no more a tube and wire than the Habirshaw, which forms its basis. The tests referred to show that, after immersion in water or being imbedded in plaster, the insulation resistance was 20 megohms per mile; but the Habirshaw wire, without the Attix covering, would have shown the same. What then is the propriety of confining the operation of this resolution to the Attix wire? Why not permit the use of any good highly insulated wire under the same conditions?

It seems to me that this resolution is one of those reversions to an ancestral type, which we find in all evolutionary development, which is of the general line of progress, and which is destined soon to become extinct.

Attention, Please!

The *Tribune* says: "The time has come for the authorities of the New York post office to employ their energies toward a stoppage of thefts of letters in the mails." Also books. During the last three months numerous electrical books mailed by us to customers have mysteriously disappeared after being posted at the New York post office. Complaints have so far failed to discover the books or locate the thieves. Will the new Postmaster-General kindly give this his undivided attention for a few minutes?

The Britannia Oil Engine.

TO THE EDITOR OF ELECTRICAL REVIEW:

In reply to Mr. C. H. Minchew's letter, in your issue of March 27, up to the present there is no agent appointed for the sale of the Britannia oil engine in America.

Yours truly,

BRITANNIA COMPANY.

Colchester, Eng., April 10, 1895.

A Delightful Spring Tonic.

In the Spring your trade may experience "that tired feeling"—be languid and flabby. Try judicious advertising and then you will be obliged to doctor your salesman for exhaustion instead of your business. —*Printers' Ink.*

TELEPHONE NEWS AND COMMENT.

A local telephone company may be organized at Canastota, N. Y.

Ground has been broken for a new telephone exchange building at Galveston, Texas.

The Marquette, Mich., Telephone Exchange was burned out on April 12 by a cross with a trolley wire.

Telephone reductions are rapidly moving in many directions. In Connecticut, the Bell people have in many places cut rates 50 per cent.

A syndicate has been formed to supply the Attleboros, Mass., with a new telephone system at one-half the cost now paid for the use of 'phones.

The annual meeting of the Mexican Telephone Company will be held in New York city on May 8. Transfer books closed April 20 and re-open May 10.

The telephone line between Ozark and Springfield, Mo., which connects with Linden, Sparta and Chadwick, is expected to be in operation on May 1.

The Citizens' Telephone Company, of Tampa, Fla., is reported to have secured 200 subscribers and expects to have its service in operation by the Fourth of July.

The Erie Telegraph and Telephone Company made a net gain of 291 subscribers for the three months ending March 31. The total number connected March 31, 1895, was 16,465.

The Southern New England Telephone Company has made a reduction of telephone rentals of 50 per cent in second and third-class exchanges. Reductions will also be made in larger cities.

A local company is being formed under the Phœnix company to compete with the Hudson River Telephone Company at Port Jervis, N. Y. The prices established are: For a business place, $30; residence, $18.

Belair, Churchville, Aberdeen, Havre de Grace and Darlingtown, Md., will soon be connected by telephone. A local company has been organized and the wires strung as far as Churchville.

The building of new telephone lines is going on in Steuben County, New York, at an active pace. Campbell, Curtis and Coopers are now thus connected with the outside world, and Avoca, Wayland and Dansville will soon be within speaking distance of one another.

Manager McLeod, of the Wisconsin Telephone Company, has been at work figuring out a basis for a general reduction of the telephone rates in Milwaukee. The directors will meet before the end of this month, and it is said that a reduction will be inaugurated on May 1.

The New York and New Jersey Telephone Company will now furnish service in Brooklyn, Jersey City, Hoboken and Newark at $40, $50 and $65 per year, according to the number of messages sent and the character of the service. The $40 rate is for a three-party line and 500 messages.

T. B. Reid, editor of the Appleton, Wis., *Post*, is about to abandon the newspaper field to enter the telephone business. Mr. Reid is to organize the Wisconsin district for a new telephone company and will probably be the company's manager in that State, with headquarters in Milwaukee.

Mr. N. W. Lillie, of the New England Telegraph and Telephone Company, Boston, has invented an ingenious wire joint, which requires no solder and makes a moisture-proof contact. The ends of the wires to be joined are laid in the channels of an S-shaped strip of copper, and are then twisted together in the usual manner.

There is now before the Connecticut Legislature a resolution for the incorporation of a telephone company to be known as the People's Telephone Company. Ex-Governor T. M. Waller, J. E. Bowles, J. Irving and J. J. Lawton are named as incorporators, with a capital not exceeding $500,000, the place of business to be in Bridgeport.

Thomas Kennedy, superintendent of the Hudson River Telephone Company, disappeared from his home at Saratoga, N. Y., on April 16. The story is that a large amount of collections have not been turned over nor accounted for. A warrant was sworn out for Kennedy's arrest and he was apprehended last Friday. It is reported that he has confessed.

The Iowa Telephone Company is following in the wake of some of the other telephone companies by a reduction of rates, to take effect July 1. The company, it is said, proposes to give its present patrons a straight reduction on all instruments used in business houses, and factories and in private houses, and to allow them the use of all toll lines free for distances in a radius of 50 to 100 miles.

The American Electric and Manufacturing Company, formerly the American Telephone Company, recently entered into an agreement with the Venezuelan Government to supply telephone service to various government offices at satisfactory rates. This company's business is reported to be constantly increasing in Venezuela, and it already has in operation a long-distance service between remote points.

H. E. Mathews, of Mathews, Hern & Company, proprietors of the Hotel Adelphi, at Huntington, W. Va., has secured a franchise for the erection of a new telephone exchange in that city, and informs the ELECTRICAL REVIEW that the Huntington Mutual Telephone Company will be organized at an early day. Mr. Mathews says he is in the market for a complete exchange of from 150 to 200 subscribers and the necessary materials for the construction of a plant.

The Rockland Telephone and Telegraph Company, with a capital of $8,000, has been incorporated in New York to construct and operate a telephone and telegraph line from Nyack to Montmoor, to Nanuet, to Spring Valley, to Monsey, to Tallman's, to Suffern, to Hillburn and Ramapo; Montmoor to New City, to Congers, to Rockland Lake, and to Haverstraw. Directors, William R. Thompson, Frank L. Colgrove, and William Dewey, of Nyack; John I. Traphagen, of Suffern, G. A. Blauvelt, of Monsey, A. A. Demarest, of West Nyack, and L. H. Hutton, of Nanuet.

The Southern Michigan Telephone Company, which constructed its line to Battle Creek last Fall, has already commenced work on a farther extension. This company is connecting the small villages that cannot afford local exchanges, and also putting in telephones for the farmers along the line. Many farmers are now availing themselves of the opportunity to connect themselves with the villages, as they find it a great convenience in calling doctors in the night and doing other business. This rural line now connects Battle Creek with Sonoma, Joppa, East Leroy, Pine Creek, Athens, on the southeast; Augusta, Gull Lake and Hickery Corners on the northwest, and West Leroy, Climax and Fulton from the southwest. The workmen are now engaged in placing the poles between Battle Creek and Centerville and Three Rivers and intermediate towns westward, and Lyon Lake, Girard and Tekonsha, southeast from Battle Creek.

The American Bell Telephone case, which was tried in the United States Circuit Court several months ago and resulted in a decree in favor of the United States against that company, to the effect that the patent granted on the Berliner transmitter be given up and canceled, came up on appeal on April 15 before Judges Colt, Putnam and Nelson, in the United States Circuit Court of Appeals, at Boston. Judge Colt informed the lawyers in the case before argument was begun that they would have four hours a day during Tuesday, Wednesday, Thursday and Friday in which to complete their arguments. The case, therefore, was closed on Friday evening and it will probably be some time before anything more is heard of it. Judge Carpenter, who rendered the decision against the Bell company, was, of course, ineligible to pass on the case, and was not present at the recent hearing. The closing argument for the United States was made by Hon. Causten Browne, and the summing up for the Bell company was by J. J. Storrow. The whole situation was reviewed and the arguments of counsel were very exhaustive. The facts in the present case are as follows: On November 17, 1891, the United States issued to the defendant corporation, as assignee of Emile Berliner, and on his invention, patent No. 463,569, for that kind of telephone transmitter known as the speaking microphone. The Circuit Court, on January 3, 1895, entered a decree that the patent be entirely canceled, resting its decision upon two grounds: First, that the patent is void, as being beyond the power of the Commissioner to issue, in view of a former patent, No. 234,969, issued November 2, 1880, to the Bell Telephone Company, as assigns of Berliner; second, the patent in suit was applied for on June 4, 1877, and issued on November 17, 1891. The appellant, in its brief, devotes a number of pages to an exhaustive discussion of the art of telephonic communication prior to the Berliner patent in suit, to show that Berliner's transmitter and Berliner's receiver constitute two totally distinct inventions. It says that when dealing with two patents granted to one inventor no question of anticipation arises, the only inquiry being as to double patenting.

Mr. Maynard Propounds a Query Anent the Washington Conduit Road.

TO THE EDITOR OF ELECTRICAL REVIEW:

The letter from the Siemens & Halske company, printed in this week's ELECTRICAL REVIEW, expresses surprise that you should have published my report on the Metropolitan company's subway electric road. Apparently the writer of the letter dislikes to know the truth. For this difficulty there are two remedies—shall I stop writing for the ELECTRICAL REVIEW, or will Siemens & Halske stop reading it?

GEO. C. MAYNARD.

Washington, D. C., April 20, 1895.

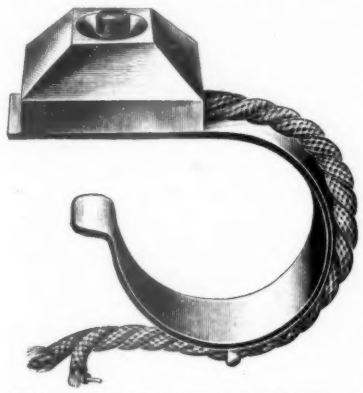
A "Trolley-Ho" Party.

The first anniversary dinner and "Trolley-Ho" party of the Brooklyn, N. Y., Electrical Society will be held on Thursday evening, April 25, at the Albemarle Hotel, Coney Island. The large "Trolley-Ho" car of the Coney Island and Brooklyn Railroad has been chartered for the occasion and will leave the power house at Smith and Ninth streets, Brooklyn, at 7.45 P. M. The car will be handsomely decorated and the hundred and odd members will show the residents along the road what lusty lungs the one-year-old organization has developed in its brief existence.

Mr. Edward R. Grier, of the firm of Grier Brothers, western representatives of Bryant Electric Company, was married to Miss Lucy Parthenia Bosworth, of Lee, Mass., on April 16, 1895. After a short trip Mr. and Mrs. Grier will return to Chicago.

Combination Clip and Push Button.

Huebel & Manger, well-known electrical manufacturers, of Brooklyn, N. Y., have recently placed upon the market a combination clip and push button which has been very favorably received by the trade. The chief characteristics of the device are convenience and adaptability, as it



Combination Clip and Push Button.

can be readily and quickly attached to a dining, chess, card or *café* table or chair or, in fact, to any piece of movable furniture.

PERSONAL.

Henry Villard arrived in New York last week.

Mr. Frederick Sargent, of Chicago, spent last week in New York.

Mr. Frank B. Parsons, of Boston, was among the visitors to New York last week.

Mr. Gerald Hart, of the Hart & Hegeman Manufacturing Company, Hartford, Conn., was a recent visitor to New York.

Vice-President Bowker, of Edison Illuminating Company, is enjoying a well-deserved rest in Europe. Mr. Bowker will return in May.

Mr. Frank Ridlon, of Boston, paid Washington, D. C., a visit recently, and was piloted over the growing capital by ex-Senator Frederic Winecup Royce. Mr. Ridlon was a former Washingtonian.

At St. George's Church, Toronto, Ont., on April 15, Alexander Moffatt, of New York, electrical engineer, and half back of the Princeton football team, was married to Miss Madeline Spratt, daughter of Robert Spratt, of Toronto.

Mr. F. J. Hastings, of the General Electric Company, was a recent visitor to Old Point Comfort and Virginia Beach, enjoying a rest from metropolitan duties. Mr. Hastings was for many years treasurer of the parent Edison company and quite active in electrical circles.

OBITUARY.

Mosley S. Roberts, at various times manager of Western Union Telegraph offices in Hartford, Jersey City and New York city, died at East Orange on April 12 of paralysis. He was born on December 25, 1819, and became a telegrapher in 1849. He was for many years manager of the bookkeeping department of the Western Union Company, and recently was connected with the auditor's office.

An Insulated Arc Lamp Hanger.

The hanger shown in the accompanying illustration is designed for insulating arc lamps when suspended out-doors, exposed to the elements, where high insulation, strength and durability is required, and fully covers the rules of all boards of fire underwriters. The ball is made of the toughest green glass, three inches in diameter, with two grooves running part way round the ball at right angles. To this is attached interlocking loops, made of seven strands of galvanized steel wire, dipped in P. & B. insulating compound, thereby insuring high insulation.

To either end of the steel wire loops are fastened malleable iron castings, provided with eyes, on one of which is hung a switch hook, on which the arc lamp is suspended, thereby insuring ease of suspending and disengaging the lamp. Above the hook is a cross-arm, also of malleable iron, one foot wide, on the ends of which are glass insulators for the suspension of the conductor wires to

Insulated Arc Lamp Hanger.

the lamps, thereby doubly insulating the lines before entering the lamp. The insulator will stand a strain of 6,000 pounds, and will withstand extreme changes of weather without deterioration. This hanger is placed on the market by the Metropolitan Electric Company, of Chicago.

Catalogues Wanted.

To the Editor of Electrical Review:

You may say to the advertisers in the Electrical Review that this company will be pleased to receive their catalogues and discount sheets. We desire to equip our purchasing department with catalogues of everything required in the operation and maintenance of an electric light plant.

We know now where they all advertise. We read the *yellow cover* here.

Yours respectfully,

The Ceramic City Light Company.

East Liverpool, O., April 12, 1895.

The work of preparing plans for the subway to be laid by the Central New York Telephone and Telegraph Company, Utica, N. Y., for which a franchise was recently granted by the City Council, has been commenced.

An Electric Club in Philadelphia.

A number of representatives of the different branches of the electrical business in Philadelphia are starting an electric club in that city. It is believed that the advantages of a place where resident and visiting electrical men can meet and entertain customers and visitors will be sufficiently recognized to win the necessary support for the club. The Electrical Review wishes the new club the best success. Full particulars can be obtained from Mr. George Valiee or Mr. Frank H. Stewart, 20 North Seventh street, Philadelphia.

The Deal That Wasn't Dealt.

The Boston *News Bureau*, on April 17, printed the following:

While General Electric directors are most reticent regarding the affairs of the company the "Street" is full of rumors to account for the activity and fluctuation in the stock. Gossip now says that the directors are considering the reduction in capitalization in order to conform to New York laws.

The business of the company is increasing and some of its friends predict that within a year it will have more business than it has facilities to attend to.

The efforts to bring about a negotiation between General Electric and Westinghouse Manufacturing companies, for the interchangeable use of patents, have been formally discontinued by the directors of the first named.

Trolley Car Fenders.

[*From the New York Sun.*]

We should say that the successful safety appliance for use until the present cars are discarded should be, first of all, not a murderous fender. It should pick up persons, large or small, whom it might encounter prone on the track and should trip persons overtaken on foot so that they would fall on top of the safety appliance and not beneath it. It should carry along, not necessarily on a feather bed, until the car could be stopped, such persons as it might pick up or trip up, or should dump them aside out of the way of the body or truck of the car. It should protect them from mangling by the projections beneath the platforms, as well as from death under the wheels. It should do this on any track smooth enough for cars to be run regularly over it, and with any possible distribution of the load in the car. It should be easily applied to any car, so that the companies would not be subjected to the cost and the public to the delay of traffic consequent upon laying up cars for a considerable period for alterations necessary before attaching the safety device. It should be reasonably cheap.

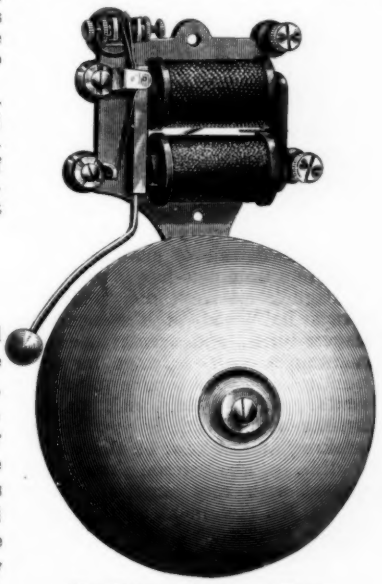
We believe that devices which should meet these requirements would be welcomed by the trolley and cable companies, and would be adopted without unnecessary delay. It is not too much to hope that they will be forthcoming before long, and it would be better to wait for them a little longer than to force the companies to substitute other murderous fenders for those now in use.

Meanwhile, it would be well for the parents of Brooklyn and elsewhere to prevail upon their children to quit the practice of darting on to the track in front of a car, standing between the rails and twirling their fingers before their noses at the anxious, almost unnerved, motorman until he brings the car nearly to a standstill. A switch applied properly to the body of a youngster inclined to court collisions with street cars, would be a useful car fender.

The Baxter Skeleton Bell.

H. E. & C. Baxter, of Brooklyn, N. Y., are the makers of the skeleton electric bell illustrated herewith. Their aim has been to place on the market a bell at a popular price and equal to the best. Several improvements in construction have enabled them to do this.

The parts of this skeleton bell are highly polished nickel, on a well japanned frame. The adjusting, contact, pivot and binding posts have the Baxter patent fastening, centralizing and securely holding them. The bell has both battery and stroke adjustment provided with set nuts. By placing the double



The Baxter Skeleton Bell.

adjustment at the back of the armature, the adjustment contact screw is done away with, which is a decided improvement, as the make and break of the contact points are the same with either a long or short stroke, allowing the armature to feel the full force of the magnets throughout its movement.

A METHOD FOR PREVENTING ARMATURE REACTION.

READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK AND CHICAGO, MARCH 20, 1895, BY HARRIS J. RYAN AND MILTON E. THOMPSON.

DISCUSSION.

The first instalment of this paper appeared on page 158 of the ELECTRICAL REVIEW for March 27, 1895, and the conclusion was published in the issue for April 10, 1895. The discussion of the paper follows:

Professor Ryan: By way of introduction, I wish to call your attention to certain points in connection with orthodox practice, in the design, construction, and operation of direct current dynamo electric machinery. In the first place, you all remember that it is necessary, in order that a proper commutation fringe at all working load outputs be maintained, that a proper reluctance of the air-gap be used in machinery usually designed for incandescent lighting, or for purposes where the load output fluctuates seldom and very slowly, so that the attendant can be depended upon for the gradual shifting of the brushes as the neutral point changes. Here smooth bodied armatures are used, and the length of the air-gap is so adjusted that it is necessary to place as initial ampere-turns—for producing that flux through the armature which is necessary for the normal pressure to be developed by the armature—that number of ampere-turns that shall be greater at all times than the ampere-turns on the armature at any particular load. Now, that did very well, when one followed out that rule for the construction of machinery that should operate in practice for incandescent lighting, with success and with smoothness as to commutation, ease in the commutation fringe, and in general behavior. But later on was developed, of course, on account of the demand for railway power supply, a generator that would supply a power load that would fluctuate very much through very wide ranges, in very short amounts of time; and you could not depend at all on an attendant to be present to shift the brushes into an easy and proper position of commutation, and it was necessary to so design this machine that sparkless commutation, so far as possible, at any rate, can be obtained at all load outputs without shifting off the brushes. Without the carbon brush, this could never have been accomplished. With metallic brushes it makes no difference even if one does adhere to the rule of maintaining an excitation from pole-face to pole-face, a magneto-motive force that will always be ahead of the armature ampere-turns, and even if one does maintain a positive fringe for commutation of a considerable value, you would have sparking with metallic brushes at no load, if you had no sparking at full load, or the reverse of this. The carbon brush was applied with very material success, and if Mr. Steinmetz, at the Philadelphia meeting, had had a little more time probably he would have called your attention to its use in commutation, in addition to the very interesting remarks that he made on the beneficial results that are obtained by maintaining a positive fringe by the use of saturated lugs in the iron-clad armature. In the first place, it will be remembered from the discussion in connection with one of the papers at the Philadelphia meeting, that Mr. Steinmetz called the attention of the members present to the fact that if you use saturated lugs, normally saturated lugs, in an iron-clad armature, you might then use a comparatively small air-gap and that the lugs would not allow (when you applied series ampere-turns) the induction to be increased by the application of those series ampere-turns, which you know are necessary in order that a fringe shall be maintained positive. Series ampere-turns, if we have small initial ampere-turns—that is, by initial ampere-turns I mean those ampere-turns that will bring the induction up to the normal at no load—and they are always small, of course, if we have a small air-gap; now, if we apply series ampere-turns on the field in proportion to the load, we can very easily adjust those series ampere-turns, so that the magneto-motive force from pole-face to pole-face will be ahead of the armature ampere-turns at all times. But we have to contend with this troublesome feature that is introduced, if we do not design the machine to guard against it; that the induction will come up with the application of such series ampere-turns which you remember are applied for the purpose of maintaining a positive fringe under the leading pole corner, so as to have the machine commutate as well as possible, at least under the load, without bad effects at the brushes. Now it was explained at that time by Mr. Steinmetz that if one saturates these lugs (see Fig. 24 as used at board), that you would in that way keep the induction from being increased under the trailing pole corners, while you might allow it to be diminished a little bit under the advanced pole corners, and the relations adjusted in such a respect that you could add on series ampere-turns in this way with this small air-gap in such amount that the impressed ampere-turns under the leading pole corners at all loads would be ahead of the armature ampere-turns. In that way you would have a positive fringe and no danger, even on very heavy overloads, of having it come to zero or reverse with corresponding disruptive effects, which always occur at the brushes. With metallic brushes, even under those circumstances, we should have a very bad behavior, and it is in connection with the points involved in the use of carbon brushes that I now want to engage your attention. If you can keep up the fringe then (or the induction under the leading pole corners) to a considerable extent, a very fair fraction of the normal induction throughout a large portion of the range of load, unless there are too many ampere-turns on the armature, you can depend on the resistance of a carbon brush for reversing the current. First of all you can push a carbon brush over into the neighborhood of a pretty large portion of the commutative fringe, or the induction in the leading pole corner, and on account of its resistance, not have much current circulate in the coils passing the point of commutation. And then again, when the current comes up under load, and pressure is needed to reverse the current on account of self-induction of this section, as a bar is passing out from under a carbon brush, the section in contact with the carbon brush, with the bar having the current in the right direction coming from this side (indicating with the use of Fig. 24), with the conductors moving in that direction, that section grows smaller and smaller every instant, and finally is nothing as it passes out from under; that current density eventually goes very high. The current has not yet been reversed in the neighboring coil. It must be reversed, however, completely and brought up to the full value of the normal before it passes out, if any disruptive effect is to not occur. Now, as this goes on, a very considerable local fall of potential occurs there (at A, in Fig. 24) and diverts a very appreciable amount of the pressure of the armature against the current that is in this coil in the former direction that it had on this side of the brush, and in that way the current is made to reverse through the action of the resistance of the carbon, and is the great reason why the carbon brush works with such wonderful smoothness on the old smooth-bodied armature where there is very little self-induction in the sections, and works with greater smoothness by far than any special metallic brush you could apply with the power generators, with the iron-clad armatures, for the substantial mounting of conductors.

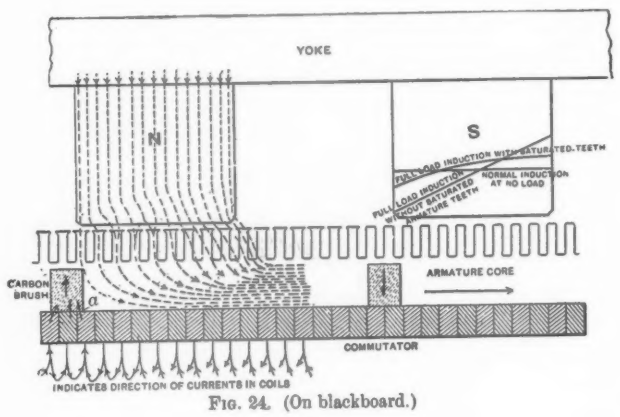


FIG. 24. (On blackboard.)

And then, while we are at this point in connection with orthodox practice, it seems to me that the tendency at the present day is, so far as possible, to do away with those T-shaped teeth. That increases the self-induction of the section to a very considerable extent. Now, these teeth are made in that shape for two purposes; one is to prevent the fluctuation of the induction density in the pole-piece, and that of course must be prevented when the pole-piece is not laminated; and the other is, that by using the T-shaped lug you are able to mount in a very mechanical and workmanlike manner the conductors on the armature. But a part of these teeth can be made T-shaped, and the balance straight, and in that way the self-induction of the section is reduced very materially over the present practice, or rather the practice, at any rate, that has been in vogue within the last two years. You find the makers nowadays in many instances resorting to the use of a field core, made up entirely of laminated iron, or pole-pieces of laminated iron; or again, with these solid pole-pieces, straight lugs are used in recent designs, and the air-gap distance so adjusted that the Foucault current effects, the eddies developed in this pole-face, are such that desirable results are obtained.

Now, I have called your attention to the fact that in all of this orthodox practice, the practice by means of which definite and the best results are obtained to-day, it is necessary to use the field ampere-turns somewhere that will be ahead in magneto-motive force impressed between the pole-faces ahead of the armature ampere-turns at any load, if best results are to be obtained. And in the paper we shall look into the use of coils that will annul the effect of the conductors along the surface, and will see how, when that is done, the ampere-turns that are applied on the field, are only those that are necessary to set up the induction, regardless entirely of any of these commutative requirements. In other words, one has the same magnetic conditions to look out for in estimating the excitation forces as you have in an alternator that is free from self-induction in its own armature circuit, and is working on a non-inductive load. You are quite free from armature reaction effects, and a very small excitation suffices. These pernicious cross-leakage effects that occur with the use of deep grooves and saturated lugs under the trailing pole corner (indicated in Fig. 24) are quite obviated, so that woven or sectioned conductors are not necessary. The output of machines, all told, has been increased through the application of such considerations very materially.

(To be continued.)

Annual Meeting of the Joseph Dixon Crucible Company.

The annual meeting of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., was held Monday, April 15, at the company's general offices at Jersey City. Minutes of meeting of 1894 were read and approved. The detailed statement showing the millions of lead pencils, cakes of stove polish, crucibles, etc., manufactured, met the hearty approval of stockholders present, which manifested itself later on by the unanimous re-election of the board of directors and officers.

Out of a total of 7,345 shares, 6,393 shares were represented in person or by proxy. The full number was cast for each of the following gentlemen: E. F. C. Young, John A. Walker, Daniel T. Hoag, Richard Butler, William Murray, Alex. T. McGill, Jerome D. Gillett. After the stockholders' meeting had adjourned, the newly elected board organized and unanimously re-elected: E. F. C. Young, president; John A. Walker, vice-president and treasurer; George E. Long, secretary.

The Joseph Dixon Crucible Company, established in 1827, is the most extensive manufacturer of graphite products in the world. Its manufactures comprise plumbago crucibles, graphite facings, retorts and other goods used in foundries and smelting works; lubricating graphite, graphite greases, graphite paints and Dixon's celebrated American graphite pencils and carburet of iron stove polish. These goods find their way and meet ready sale in all the cities and towns of the civilized world.

ELECTRIC RAILWAY NOTES.

Work is being pushed on dynamo No. 2 at the power house at Niagara Falls.

Work has been commenced on the Cohoes, N. Y.. City Railway Company's new road.

Work on the new Beverly, Essex and Gloucester, Mass., street railway has commenced in earnest.

A bill has been introduced in the Pennsylvania Legislature compelling the use of fenders on electric cars.

It is hoped that the electric railroad between Winooski and Essex Junction, Vt., will be in running order by June 1.

The Troy, N. Y., City Railroad Company recently placed an order for 20 new open cars, and about half of them have been delivered.

The Sheffield and Tuscumbia, Ala., Street Railway has been sold to J. W. Falkner, representing the Louisville and Nashville Railway, for $6,500.

The Interstate Consolidated Street Railway Company is hastening the work of repairs and re-grading on its line between Attleboro and Plainville, Mass.

The Holyoke Street Railway Company is pushing matters in the construction of the street railway route from Chicopee Falls to Holyoke, Mass., by way of Aldenvill and Willimansett. The company has begun to lay the tracks and has about 2,500 feet laid already.

A new motorman amused some of the other hands Tuesday night by complaining that he could not see because he did not have a headlight. He looked over the front of the car and did not see a light and thought there was none on the car. It was one of those cars with the headlight overhead.—*Orange County, N. Y., Press.*

A few days ago Even B. Stotsenburg, receiver of the Highland Electric Railway Company, received from a former conductor $3. The conductor explained that while in the service of the road he "held out" the money returned one Sunday when travel was good, and that he had become conscience-stricken and desired to return the money. — *Louisville, Ky., Courier-Journal.*

The railroad committee of the legislature has reported favorably a bill establishing the same system of fares on Sundays as on secular days in Connecticut upon steam railroads. The same committee has decided to consider each application for a trolley road charter on its merits, and without special regard to paralleling of steam roads. This is a defeat for the steam railroad companies of the State, which asked a general rule in relation to parallels.

The electric street railway lines of Atlanta, Ga., are making very elaborate preparations to handle the immense crowds during the Cotton States and International Exposition. The grounds will be reached by five lines, and the terminal will be in the form of a double loop of tracks, which will enable any number of cars to roll in, unload, load and roll out in the shortest possible time without delaying the cars behind them. The terminal facilities of both the electric and steam car lines will be very ample.

Mr. C. D. Jones will retire from the management of the Burlington, Ia., Electric Railway Company on May 1. Mr. C. H. Walsh, in addition to his duties as manager of the steam heating and electric light plants, will assume the active management of the street railway lines. Mr. Jones will shortly take up active work in connection with the 75 miles of electric railway at Memphis, Tenn., now under the management of his brother, Mr. Frank Jones, the builder and former manager of the Burlington electric lines.

The Interstate Street Railway connecting the Attleboros and Wrentham, Mass., with Pawtucket, R. I., and which has remained unoperated since January, 1894, was sold in Attleboro, on March 30, to the "Price Syndicate" for $101,000. The Union Traction Company, which owns the Providence and Pawtucket lines, bid $100,000. Laborers have begun to make necessary repairs on the road, and it is announced that the road will again be in operation by the first of next July. Pawtucket parties are now interested in the system, and the resumption of traffic is assured.

That which was foreseen some years ago has come to pass in the severe competition which steam railroads are now experiencing from the trolley roads that are being constructed everywhere to draw away their traffic. Naturally, this change has been most marked in the older and more thickly settled districts of the East. We of the Twin Cities have seen how an interurban electric line has been able to attract to itself pretty nearly the entire passenger traffic between St. Paul and Minneapolis. The steam roads which once counted this as a most profitable portion of their business have practically withdrawn from the field.—*St. Paul, Minn., Pioneer Press.*

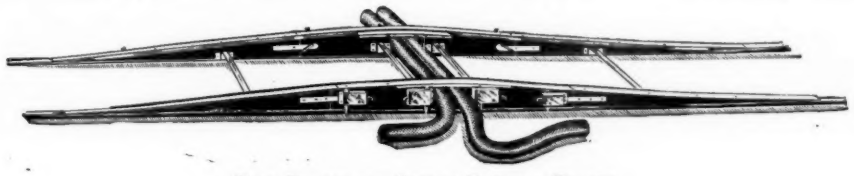
The Baltimore and Ohio Railroad officials are said to have determined to open the Belt railroad and tunnel for business on May 1 without waiting for the arrival of the big electric locomotives which are eventually to haul the trains. The overhead electric work will then be completed in the tunnel and in approaches thereto. This decision was reached because it is reported it will probably be two months before the electric engines are ready for the service, and the company is desirous of using the new line because of the time and trouble it will save it in the handling of its New York and Washington traffic. The Belt railroad and tunnel has cost the Baltimore and Ohio Company about $8,000,000.

A Portable Hose Bridge for Street Railway Tracks.

The Metropolitan Electric Company, 186 and 188 Fifth avenue, Chicago, has recently brought out an ingenious device, which has pleased the firemen in various cities and has proved to be a great convenience to electric railway companies. It is a portable hose bridge, which is designed to prevent many of the delays to street railway service incident to fires and at the same time to avoid interference with the fire hose. The illustration on this page shows at a glance what this bridge is.

It is 16 feet in length, each side being in three sections. These sections are quickly connected by means of a patent clasp, holding the parts firmly and rigidly together. Braces hold the two sides firmly in place, while patent ratchet spikes, held firmly by springs, hold the parts to the ground and rail.

The parts are all made of the best and heaviest materials and will carry the heaviest motors and trailers easily. The bridge will fit any kind of rail and is made for any gauge. Every bridge is guaranteed for 10 years and will last much longer. It can be placed in position by one man inside of three minutes, and can be carried to the scene of the fire, either in a car or a "hurry up wagon."



Hose Bridge for Street Railway Tracks.

Two lines of the largest fire hose made can be used through the bridge.

The connection at each end with the rail is perfect and the rise of a car in going over the bridge is so gradual and slight as to be hardly perceptible. In case of a fire the use of these bridges, in avoiding delays, will make them pay for themselves in one day. These bridges are in use in Detroit and other cities and are giving every satisfaction.

ELECTRIC LIGHT FLASHES.

The Lowell Electric Light Company, it is said, is to renew a large portion of its wires to Lowell, Mass.

The unusual Spring freshets are interfering with the operation of many electric light plants in all parts of the country.

The Light, Heat and Power Company, of Richmond, Ind., will not buy a generator until the question of the city purchasing the plant is settled.

The Leather Belting Manufacturers' Association advanced the prices of belting 20 per cent on April 22. The scarcity of cattle and hides in the West is given as the reason.

The New York Assembly Cities Committee has reported favorably a bill to reduce the price of electricity and gas in cities of the first-class, which means New York, Brooklyn and Buffalo.

The Edison Electric Illuminating Company of Boston has declared its regular quarterly one and one-half per cent dividend, payable May 1. Transfer books closed April 15 and reopen May 2.

The Edison Electric Illuminating Company of Brooklyn, N. Y., reports gross earnings for March of $39,394, an increase of $7,706 as compared with the same month of last year, and net $12,290, a decrease of $1,561.

There is a proposition before the Philadelphia Public Building Commission to establish an isolated electric light plant in the City Hall court-yard to furnish 15,000 incandescent lights for the building and 2,000 arcs for city lighting.

Purchases for the 450 arc light plant for Hudson County, N. J., and for the 150 arc and 2,000 incandescent light plant for Kearney Township, Hudson County, N. J., will be made at the office of Geo. F. Woolston, Jr., 40 Wall street, New York.

A deal consolidating the Bristol, Conn., Electric Light Company and the Bristol and Plainville Tramway Company gives in exchange for the stockholders' interest in the electric light company stock in the consolidated concern in all but one or two cases, where cash is paid.

There are arrangements in progress for the organization of a new electric light company in Indianapolis, Ind., whose field will be the suburbs outside of the city lines requiring wires to be placed under ground. Leon O. Bailey is the attorney for the company, which includes local capitalists.

A five-year contract for supplying the new electric street railway company with power to run the cars has been signed by Gen. Charles Williams for the company, and by the president and treasurer of the Manchester, N. H., Electric Light Company, which is to furnish the motive power. The stipulation is that the Manchester Electric Light Company shall furnish power commencing July 1, to run not less than 15 cars nor more than 50.

One of the great features of the Cotton States and International Exposition at Atlanta, Ga., will be the electric fountain, authorized at a recent meeting of the Executive Committee of the Exposition Company. The fountain will be designed by Mr. Luther Stieringer, who designed the electric fountains at the World's Columbian Exposition. It is proposed to have the fountain rise from the middle of the grand basin, in front of the Machinery and Forestry Buildings. From this point it will be visible all over the Exposition grounds, and the effect produced by columns of water with infinite variety of color and brilliance will be exceedingly beautiful.

THE TROLLEY WAR IN CONNECTICUT.

AN ANSWER TO THE ARGUMENTS OF THE STEAM RAILROAD MEN.

On March 22, 1895, before the Committee on Railroads of the Connecticut Legislature, Mr. Edwin B. Gager, of counsel for the street railway companies, made the following answer to the arguments of Vice-president Hall, Hon. H. C. Robinson and Hon. E. D. Robbins, who appeared on behalf of the Consolidated road:

Mr. Chairman and Gentlemen of the Committee: It is now something over a month ago that the officials of the Consolidated road served notice upon the street railway companies of Connecticut that the granting of any franchise to operate street railroads parallel to the lines of that great corporation would be opposed before your honorable committee, and that at a future day the reasons for such opposition would be presented. At once the machinery of this corporation was set in motion to draw maps and compile statistics, and its eloquent vice-president has appeared before you with a carefully prepared statement and has presented its claims for your consideration. In the most formal and well considered manner, the managing power of this corporation, representing $38,000,000 of capital, has issued its manifesto and placed itself on record before the people of this State.

The proposition made to the people of this State, and his argument has no force if this is not its meaning, is this:

"There shall be no more street railways whose operation may diminish the earnings of the Consolidated road."

"Thus far and no further," is the language of Vice-president Hall.

Now what is the argument? I have studied the claims advanced by Mr. Hall with care, and I confess to a feeling that the logic of the case has overpowered him, and that he has argued for the street railways better than I can. Let us examine his argument fairly and in detail.

His first proposition is that the street railways represent foreign capital and foreign syndicates, and that they "interfere with the vested rights and property interests of our citizens." Let me repeat, the vice-president of the wealthiest corporation in Connecticut seeks to prepare your minds for this discussion by arousing your opposition to foreign capital. Hear him:

"No one connected with the New Haven road at the time of this wholesale grant of electric charters supposed that there was a scheme developed by the New Jersey, Pennsylvania, New York and Massachusetts syndicates, who own almost all the stock of the electric roads in this State, to parallel the Consolidated road its entire length from Springfield to New York. If it is the policy of the State of Connecticut to make a present of the use of its highways to foreign syndicates for the purpose of interfering with the vested rights and property interests of our own citizens, it is time all our people, and especially those who have invested their money in steam railroad property or securities, understood it."

And again:

"But can this first-class service and appointments be expected or fairly demanded by the public, if the State is to allow a horde of foreign speculators to parallel every station on its line and destroy entirely its local travel?"

I had supposed, gentlemen, that if foreign capital would come in and do for us what our timid capital will not, that the inhabitants of this State would reap the gain while some one else took the risk. We like to get foreign capital to locate its business with us. The Consolidated road does not want it in the street railway business for reasons that will appear. But what now are the facts?

I have examined the sworn returns of 15 street railroad companies on file in the Railroad Commissioner's office, all I could get—and the others would not materially change the result, and I find that these 15 companies on September 30, 1894, represented a total capitalization of $4,577,000, of which $1,414,000, or 30$\frac{8}{10}$ per cent, was owned by residents of this State, and that out of a total of 612 stockholders 423, or 69$\frac{3}{10}$ per cent, were residents of this State. I found that eight of these 15 companies are controlled by Connecticut capital, and of these eight distinctively home corporations six are treated by my friend as paralleling roads, while of the seven companies controlled by foreign capital, but four can in any sense be called parallel.

Well, gentlemen, the case looks bad for the foreign capitalists, doesn't it? It was shrewd to lay in the element of foreign capital, wasn't it?

But stop a moment. Steam railroad companies have to make the same kind of returns as street railway companies. By examination of the Railroad Commissioner's report for 1894, I find these facts:

The entire capital stock of the steam railroad companies of Connecticut, June 30, 1894, was $90,096,840.88, of which $25,694,600 was held by residents of Connecticut, or 28$\frac{5}{10}$ per cent of the steam road stock was held by residents of this State, as against 30$\frac{8}{10}$ per cent of the street railway stock. The odds is not great, but it is in favor of the street roads as home institutions. The total stock of the New York, New Haven and Hartford Railroad Company was returned at $37,912,900, of which $11,372,100, or only 29$\frac{7}{10}$ per cent. was held in Connecticut; not great odds, but still in favor of the street railway companies. The total stock of the New York and New England Railroad Company, the other great railroad corporation of this State, was $28,817,000, of which $3,8,400 was owned in Connecticut, a paltry 13$\frac{7}{10}$ per cent. From the same returns I find that the entire number of stockholders in the New York, New Haven and Hartford Railroad Company, June 30, 1891, was 6,070, of whom 2,548, or 42 per cent, were residents of Connecticut, as against 69 per cent for the street roads, a difference in favor of the street roads of 27 per cent, while of the stockholders of the New York and New England road only four per cent were residents of Connecticut. Tried by every test the steam roads are the representatives of foreign capital and foreign syndicates rather than the street railways. I told you my friend had argued my case better than I could. If any weight is to be given to the question as to where the capital comes from to build street and steam roads, my friend has struck his own company the heavier blow. "People who live in glass houses should not throw stones."

But hear my friend again:

"No, the New York, New Haven and Hartford Railroad is a Connecticut institution by birth, the majority of its directors are residents of Connecticut, its headquarters are here, and its stock is scattered in small blocks among hundreds and thousands of Connecticut citizens—men women and children."

And he asks your sympathy on this ground. Why, I supposed every street railway company was a Connecticut institution by birth—they were born here in the capital—that a majority of their directors were residents of Connecticut, the street railway law so requires—that their headquarters were here—it is so in fact, and a greater proportion of their capital stock is held by Connecticut people than the stock of the steam roads.

I am tempted to lose patience when the vice-president of this road attempts, in view of the actual facts, to presume upon your unfamiliarity with the facts and instill into your minds the subtle poison of hostility to foreign capital. I might borrow from the abundant vocabulary of my eloquent Brother Robinson and say that such a pretended argument coming from such a source was "malicious as hell."

But I won't say it. My Brother Hall did not sit down and count his forces when he framed that part of his argument.

We will dismiss this matter right here, because all my distinguished adversaries say they are entirely friendly to street railways "if they will only keep within their sphere," meaning thereby that their sphere is not to carry one who would ride on a steam car if there were no street cars.

They say:

"Let it be understood, then, that the steam roads are not hostile in any manner to electric roads, as such, within proper and reasonable bounds."

They say the street roads are going beyond their sphere.

What is the legitimate sphere of a street railroad?

I admire the ingenuity of my friend, Robinson, in going down into the wilds of Arkansas and extracting his ideally perfect definition of a street railway from the opinion, and he quotes from it as follows:

"The difference between street railroads and railroads for general traffic is well understood. The difference consists in their use and not in their motive power. A railroad, the rails of which are laid to conform to the grade and surface of the street and which is otherwise constructed so that the public is not excluded from the use of any part of the street as a public way; which, at a moderate rate of speed, compared to the speed of traffic railroads; which carries no freight, but only passengers, from one part of a thickly populated district to another, in a town or city and its suburbs, and for that purpose runs its cars at short intervals, stopping at the street crossings to receive and discharge its passengers—is a street railroad, whether the cars are propelled by animal or mechanical power. The propelling power of such a road may be animal, steam, electricity, cable, fireless engines or compressed airs; all of which motors have been, and are now, in use for the purpose of propelling street cars."

I wondered long what was so suductive to him in this definition, but finally I struck it. The words "in a town or city and its suburbs" seemed to fit the necessities of his case and he laid hold of it at once.

Let me quote you a briefer and more correct definition. I quote the first section of Booth on street railways, the most recent and the best authority on the subject:

"Street railways are those which are constructed in the streets, whether on, below or above the surface, along and over which cars are propelled by animal or other power on fixed tracks as common carriers of passengers for the convenience and accommodation of the people living upon or near such highways, and to facilitate the transportation of travel thereon. When a railway is laid in a street to facilitate its use by the public, it is a street railway, whatever the means used to propel its cars. A distinctive and essential feature of a street railway, in relation to other railroads, is that it is exclusively for the transportation of passengers and not of goods."

There is not a single street railway charter or extension asked for whose purpose does not conform exactly to this definition.

Judge Hall dwells at length on the confusion that exists because electric roads are set in one class and steam roads in another, and with apparent seriousness attempts to argue that because the power for both classes of roads proceeds primarily from the combustion of coal, that an electric road is only an indirect steam road. He says: "It is not a question between steam and electricity, it is a question between direct steam and indirect steam. Both are really steam roads." What sophistry. If we should generate our electricity by water power, as will soon be done in places, what becomes of his analogy? His theory is entirely contradicted by the definition of street roads by both the Arkansas Court and Booth on street railways. As well argue that a man is a steam engine because the power of both is a result of combustion in different forms. Throughout this entire discussion, when we speak of electric roads we mean street roads. No company is asking for any other than street railway privileges. The designation of the power used is merely accidental. I should do scant justice to your intelligence if I should dwell further on the distinction between the two.

The street railway is a legitimate and proper form of applying the highways to the uses to which they are set apart, and the electric street road is simply the most efficient means of communication along the line of its route yet devised, and imposes no new burden on the highway. I quote from section 83 of Booth again:

"After a full consideration of the various objections raised to the use of electricity, every court of last resort to which the question has been submitted has held that the electric street railway does not constitute a new servitude and that the use of this motive power when duly authorized does not entitle the abutting owners to compensation."

Every court of last resort except New York has held this as to the horse railroad, and every court which has considered the question holds the same view as to electric street railways. Indeed, in the Arkansas case, which my Brother Robinson quotes, it was held that a steam railway was a legitimate use of the highway and imposed no new burden. Mind, I am speaking all the time of street railways and not the kind of electric railways which I understand the Consolidated road will send Colonel Heft down to Nantasket to build.

The real thing our friends object to is competition by street railways, as they say, "cheap electric competition." In other words, they concede that the street railways are ready to furnish to the people of this State more convenient service at a cheaper rate, and claim that the people should not have it.

Before looking at the detail of their plaintive appeal let us see just what the nature of this "cheap electric competition" is. From the nature of the service it cannot extend to any considerable distances. Indeed, my friends concede this for they talk only of loss of local earnings, loss on short trips. The steam road does not stop at every man's door; its business is of the nature characterized as through business. We may well say, paraphrasing the language of my learned friend's argument, that we have no spirit of hostility to steam roads as such, if they will stick to their legitimate sphere. Stick to your fast expresses, your through trains, your freight transportation, but don't have the effrontery to say that no one shall give the people of this State that kind of service you can't give, because while giving that service some small fraction of your local earnings may be taken away. It is simply incidental that some of these street railway lines diminish your local receipts, but the traffic taken from you wouldn't justify the construction of the cheapest street railway line in the State. And the proposition advanced to this committe is in effect that the 99 persons shall be debarred from convenient, cheap and frequent service lest you may be deprived of the fare of the 100th man who might otherwise travel your road. I say the nature of the service and the rate of speed of street cars necessarily prevent any competition over distances of any length. Section 13 of the street railway law of 1893 absolutely limits the rate of speed of street cars to 15 miles per hour, and the local authorities may limit the speed still further.

The railway map of the State is shaken out and the red lines denoting the street railways are shown in some instances running along by the black lines of the steam roads, and the cry of "parallel" is raised, and the red flag of "foreign capital" is flung out to frighten the specter away. How absurd for serious men, knowing the legal limitation as to speed and knowing the prohibitive limitations on competitive speed imposed by the conditions of the traffic, to fly to the people's legislature for relief. Why, down in Pennsylvania, where Brother Robinson says the courts have constructed the term "parallel," it has been held that the constitutional prohibition against railroad companies leasing and operating a "parallel or competing line" does not apply to street railways at all. 13 Phila. 128. Why are these red lines on the map so near the black ones? Not to make a through route from Springfield to New York, but because there are the people to be served by this cheap electric system. No man is forced to forsake luxury of travel on a Consolidated way train for the hardships of the street car. The fact is, the people want this cheap electric service, and that they want it is demonstrated by the fact that they ride.

It is idle for Judge Hall to say the street railway was not designed or intended to furnish transportation from one town to another, that it was designed simply to take the place of a hack or omnibus. The steam road was first devised only to carry coal. The old stage lines might as well have contended against the introduction of the steam car as for the steam road to protest against the street road. Gentlemen, this push forward in the line of transportation is simply one of the marks of progress of the day, and if you will not give free scope to this progress those who come after you will.

From the time of the invention of the power loom to this moment before you, gentlemen of the committee, every great improvement satisfying the needs and desires of the people better than existing means, has been met by the cry of "vested rights." Judge Hall says, "The time has come, however, as it seems to us, when the State should adopt some definite policy as to the regulation and restraint of electric roads, so that the vested rights of the steam roads may be fairly protected against unfair and unjust competition." We touch none of these "vested rights" unless the steam roads have a vested right to compel the people of this State to walk through the slush, snow and mud of Winter, and the dust and heat of Summer, that an insignificant part of the earnings of the steam roads may not be diverted. I have no hesitation in saying to this committee that whenever you find that a street road will not furnish rapid transit in a more convenient manner, at a cheaper rate, in that case there is no call for a street road, and two corporations ought not to be given franchises to do the same work which one can do as well so long as the one is reasonable in its services and charges. No one wants to build a street road through the "desert wastes" Judge Hall talks of. We want to build, and ask permission to build, where and only where there are people to be served as the steam roads cannot by any possibility serve them.

But let us turn now for a moment to the specific illustrations of loss given in my friend's argument. I cannot analyze them all. A few specimens will stamp the whole. He says "between Norwalk and Rowayton a loss of 50 per cent of the entire business." I find from their own figures, distance four and three-quarters miles, electric five and 10-cent fares, 10-minute service. The time table gives 15 east-bound trains and 12 west-bound trains stopping at Rowayton daily. That is, the electric road gives not less than 84 trips while the steam road gives but 27. The electric takes the passenger at his own door and lands him right at his destination. Moreover, the loss is given in percentage. My friends don't tell how many people they actually carried between these points; we shall see that while the percentage sounds large, the figures of the actual numbers carried would make the whole argument ridiculous, and I venture to say the street road is carrying 20 times the people on this line that the steam road ever carried between these points.

Bridgeport and Southport, a loss of 80 per cent, he says. Southport has 12 east-bound and 11 west-bound trains daily. The street road gives 14 and 20-minute service.

Bridgeport and Stratford, $35 per day, they say. Stratford has on the main line and the Naugatuck division 17 west-bound

trains per day and 19 north-bound and east-bound trains. The electric gives a 10-minute service.

"Waterbury and Naugatuck 90 per cent of all business." Naugatuck has seven south-bound trains and six north-bound, while the street road runs under 12-minute headway.

"Between Wallingford and Meriden 30 per cent of all business." Wallingford has nine north-bound trains and eight south-bound, while the street cars run under 30-minute headway.

"Derby, Birmingham and Ansonia 90 per cent of all business." Between Derby and Ansonia there are eight trains each way, for the Derby and Naugatuck divisions run on practically the same time-table, while the street road gives a seven and one-half-minute service between the two villages. These figures are for the past three months, he says. But our road has been running for eight years. I believe the figures are untrustworthy.

And now we come to Winnepauk and South Norwalk—50 per cent less one way and 90 per cent the other. Let me read from their statement filed with the committee:

"The business at Winnepauk was very small to start with, but has been still further reduced by electric competition. Twenty-two passengers were carried in 1893 during the month of December and eight during the corresponding month of 1894, from South Norwalk to Winnepauk, and from 42 to 1 from Winnepauk to South Norwalk."

How much larger it sounds to say a loss of 50 per cent than to give the figures and say a loss for a whole month's traffic of 14 passengers.

So I might go through the list, but time forbids. Gentlemen, I cannot put in a stronger argument for the public convenience and necessity of these lines than the elaborate tables filed by my friends, supplemented by their general time-table and rate-schedule, and I thank my friends for furnishing this convincing proof of the public convenience and necessity of these street railway lines.

These tables show, in part, why some of their local traffic is taken. The steam roads are behind the age in the matter of local transportation, and every man on this committee and in this legislature knows it.

Now what does all this amount to? My friends say in one of their reports filed with you that it means an aggregate loss of $4,000 per month on local fares, or a grand total of $48,000 per year on a total passenger income of $12,971,000, or a loss of about one-third of one per cent—the "velvet of profit" that my friend tells of. And how does this loss affect the road? I am informed that its stock has risen from 178½ bid July 1, '94, to 195 bid March 21, '95, and from 183½ asked July 1, '94, to 195½ asked March 21, '95, and that the stock has run to 200 asked. I find that this company paid last year $3,631,000 in dividends—almost 10 per cent on its capital stock. And yet my friends come up and ask the protection of the general assembly because there is danger that local fares to the extent of one-third of one per cent on passenger earnings may be lost, while they are paying 10 per cent dividends and capital stock has risen from 178½ to 195½.

I wonder if my friends have sought relief from the legislature of New York against proposed lines extending to the northeast of New York city. I wonder if Judge Hall has knocked at the door of the general assembly of Massachusetts and demanded that no more street railways should be constructed along the route of the Old Colony road. If so, we have not heard of it. Doubtless all his energies have been strained to recover the 55 passengers per month lost between Winnepauk and South Norwalk, and to prevent a parallel to the Suffield branch on which Brother Robinson says they are carrying the grand total of about 100 passengers per day.

But let me read again from their report: "The figures show a loss of $4,000 per month on local fares, notwithstanding the general business of the road has increased."

Mark it, gentlemen of the committee, "notwithstanding the general business of the road has increased." Out of his own mouth the claim that the net result would be favorable to the steam roads has been verified.

I told you Judge Hall had argued our cause. Increased convenience of access to the stations of his roads increases his through travel, more than compensating for the loss of some local fares.

Of course, gentlemen, there is no question about the roads already chartered. "Thus far and no further" is the fiat of the Consolidated road. The argument from results already obtained is one for application to pending charters.

Doesn't it prove that you should be liberal to these roads and to the people of the State in this matter of cheap, convenient local transportation, and that free play should be given for the application of the principle of public convenience and necessity? The fact is, my friends are not willing to rest their opposition on this ground. They wish to prevent the people of the State from getting what public convenience and necessity call for.

"Upon what meat doth this our Cæsar feed
That he is grown so great,"

that the public convenience and necessity of the people of this State should be sacrificed by you lest possibly one-third of one per cent of the gross passenger earnings of this road coming from local fares should be lost, "notwithstanding the general business of the road has increased?"

I have already mentioned the street railway law of 1893. Street railway men recognized the possibility of a parallel and did not wish to interfere with the vested rights of any corporation.

We met the representatives of the Consolidated road at New Haven and agreed upon a means of settling that question without turning the committee into a court to determine facts. All parties agreed upon section 8 of the street railway act of 1893, drawn under the supervision of counsel of the Consolidated road, as the fair settlement of the parallel question so far as legislative action was concerned. Let us read it:

Section 8. "No street railway shall hereafter be built or extended from one town to any other town in the public highways, so as to parallel any other street railway or steam railroad, unless authorized by special charter prior to January 1, 1893, until the company desiring to build, construct or extend such railway shall have applied to the Superior Court or any judge thereof, and shall have obtained from such court or such judge, in the manner hereinafter required and provided, a finding that public convenience and necessity require the construction of such street railway. Any street railway company intending to build, construct or extend any such railway shall make application to such Superior Court or such judge for a finding that public convenience and necessity require the construction of such railway; and such Superior Court or such judge shall thereupon fix a time and place to hear said application, and shall cause notice to be served upon any steam railroad company or companies, and upon any street railway company or companies that may be affected by the construction of such road, and upon the selectmen of any town, the warden and burgess of any borough, or the mayor of any city, within whose limits such railway may be built. Said Superior Court or such judge shall have power to hear the parties and determine whether public convenience and necessity require the construction of such street railway, and the decision of said court or judge shall be final and conclusive upon the parties. Such court or judge upon such hearing may make an order or finding of public convenience and necessity for the construction of such street railway for a part of the distance applied for, if said court or judge shall find public convenience and necessity require the construction of a part only of such street railway."

Here you see it is left with the Superior Court to determine upon a judicial hearing whether "public convenience and necessity require the construction of such street railway."

We don't ask to be relieved from that act. It is fair to the steam roads, fair to the street roads, and above all, fair to the people, for it is their use which determines the question; and I affirm that any steam road which seeks to retain an advantage at the expense of the public convenience and necessity of the people, determined by so competent a tribunal as our Superior Court, is seeking what is unfair, what is oppressive to the people and what justifies the feeling sometimes expressed that the State of Connecticut is to be handled for the benefit of the "Consolidated road." If you depart, gentlemen of the committee, from the straight road of fair play on the question of public convenience and necessity, you can justify your conduct neither to your own conscience nor to the people of the State.

But my friends again seek to prejudice your minds by the talk about giving up the highways to this horde of foreign speculators.

I have already dwelt upon the law of use. What is the fact as to control? I refer you again to the general street railway law, freely agreed to by the street railway men, which places the absolute charge of all details of construction, operation and location in the municipal authorities' hands. In the strictest sense these companies are under local control. The people who use these roads, by their local officers, control the use of the highways by the electric roads. And the fact that the highways can be used is the very reason why the people can be served so cheaply and so conveniently.

Now, gentlemen, in determining your policy in this matter I ask you to consider that you represent the State, and not any particular interest. The State is interested in the development of local transit. The growth and prosperity of the State in the future largely depends upon the question whether Connecticut falls behind the neighboring States in this respect. From the report of the Railroad Commissioners I find that for the year ending June 30, 1894, the steam roads of the State, including the Old Colony system, carried about 53,000,000 passengers. The Old Colony system carried about 20,000,000, leaving as the business fairly to be credited to Connecticut companies the transportation of 33,000,000 passengers, and this figure has not materially varied for several years From the returns of the street railway companies, supplemented by special inquiries, I find that last year the street railways of this State carried about 30,000,000 people, all Connecticut and local travel; and it is estimated that by the close of 1895 the roads now built and being built will be carrying not less than 40,000,000 people per annum. The street roads are carrying more people on the whole, and more Connecticut people by far, than all the steam roads of the State, and every person riding in a street car does so because convenience and necessity render it the most desirable mode of travel for him.

Last year the street roads paid into the treasury of this State $69,787 in taxes Next November the amount will, undoubtedly, be over $100,000. The street roads are taxed on precisely the same basis and under the same supervision as the steam roads. In addition they are compelled to maintain the highways through which they run for the space between tracks and two feet outside of each rail, to the satisfaction of the local authorities, and to pay all damages which may happen if this surface is out of repair. The street roads bear their full share of public and local burdens, and they raise the value of the property on every street and road through which they pass. Why it was only the other day that a gentleman from New Haven was up here to favor some additional imposition on their street roads, and in the same breath he said that the electric road in front of his house raised its value $1,000, and that the electric road was much less troublesome to the highway than the horse road, about which no question was raised.

Now, gentlemen, I think the policy of Connecticut with reference to street railways was wisely formulated in the act of 1893, and that the question of paralleling was there fairly and equitably settled. Adhere systematically to that policy, and the street railway development in this State will be upon sound lines, and you will be relieved of an infinitude of detail and perplexity.

In my judgment the question to be determined by your committee is not what effect would a given street road, if built, have upon the local traffic of a steam road, but is rather this: If the street road is built will it give the residents along its line cheaper, more convenient and more frequent transit?

Whether this committee shall stand or fall in the judgment of the people of this State, whether the General Assembly shall stand or fall, so far as this question is concerned, depends upon which one of these two questions you set yourself to answer. And, if after you have acted, the question of parallel should arise, the Superior Court is a competent, a conservative and safe tribunal to determine it.

I close with a quotation from the report of the Massachusetts Railroad Commissioners for 1895, received in the Railroad Commissioner's office only yesterday. After speaking of the volume of traffic, which in Massachusetts last year was 111,000,000 more than on all steam lines, and the increase in last year's street railway traffic, as compared with steam, they say:

"The fact that the actual increase was so large, or that there was any increase even, is evidence of the remarkable persistency and stability of street railway traffic. The figures of the last year demonstrate that street car transportation is not only a convenience, but such an absolute necessity in the every-day life of great masses of people that even the hardest times cannot materially diminish its volume and growth."

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Made into any design for Electrical Trimmings, Push Buttons, Knobs, Handles, etc. Can be made to cost no more than other material.
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NOTICE OF RECEIVER'S SALE.

Electric Light Plant.

Notice is hereby given that the undersigned, Receiver of all the property and estate of the Hammond Light and Power Company, of Hammond, Indiana, heretofore appointed by the Lake Circuit Court of said State, will offer at public sale, to the highest and best bidder, upon terms hereinafter expressed, on the 25th day of April, 1895, at 10 o'clock A. M., at my office in the said city of Hammond, the following property, to wit: All the property, rights, franchises, privileges, plant, power house, power plant, engines, dynamos, machinery, boilers, poles, wire and all fixtures and appliances owned by said Hammond Light and Power Company, including as well franchise from said city of Hammond, and its franchise from the commissioners of Lake county, and also its Real Estate, being Lots 21, 22 and 23, in Block 17 of east part of North Side addition to the town (now city) of Hammond, Lake county, Indiana; excepting, however, all choses in action, book accounts and other accounts and bills receivable of the said company. Said property to be sold subject to a mortgage indebtedness of $80,000, and for not less than $15,000. A deposit of $2,000 in cash or certified check for that amount shall be required of each bidder before receiving bids, said sum to be applied to the purchase price of successful bidder, and the deposit of other bidders returned to them at once. The further sum of $5,000 to be paid Receiver upon confirmation of sale by said court, and balance of purchase price to be paid 45 days from the date of confirmation of such sale. Said sale to be made in conformity with the order of said court, entered March 8, 1895. Address all inquiries to the undersigned.

ADELBERT W. WARREN, Receiver.

FIRE.

The destruction of our Works by fire on the 7th inst. was almost complete.
We have already resumed manufacturing and are making limited shipments, which are daily increasing.
Send us your orders. We will fill them with reasonable despatch, or advise you promptly if we cannot.

CROCKER-WHEELER ELECTRIC COMPANY,
Manufacturers and Electrical Engineers.
New York. Chicago. Boston. Philadelphia.
Sizes up to 250 H. P.

KINDRED INTERESTS

The Rhode Island Tool Company, Providence, R. I., report that business is very good with them and that they are working a large force of men on full time.

The American Watch Tool Company, Waltham, Mass., report that they are crowded with orders and that they are increasing their force as rapidly as possible.

The Russell Electric Manufacturing Company, Providence, R. I., has issued a very handsome advertising card illustrating the Russell mast arms. In the center of the card is a very good albertype portrait of Minnie Seligman-Cutting, the well-known actress.

The Perfection Dynamo Brush.—The branch office of Chas. E. Chapin, 1649 Monadnock Building, Chicago, has sold to the Western Electric Company, of Chicago, a complete line of Perfection dynamo brushes. The Western Electric Company will supply the trade of the West at short notice with these brushes, which are meeting with great favor and are being rapidly introduced. The brush is flexible, being made of woven copper wire, cut on the bias and wound so that no solder or stitching occurs on the working end.

The New Jersey Asbestos Company, 117 Front street, Camden, N. J., has issued a remarkably handsome and complete catalogue of asbestos and asbesto-metallic products for every service where materials of this character can be used. The cover of this pamphlet carries a tasteful design printed in colors and numerous half-tone pictures, illustrating various processes in the manufacture of asbestos materials, embellish the pages. Every user of asbestos for any purpose—steam packings, jointings, boiler and pipe coverings, decorations—should send for this catalogue, which is supplied free on request.

The Mather Electric Company, of Manchester, Conn., report a continuation of the large amount of new business which has been secured. The following sales were made last week:

The C. Weyand Brewing Company, Buffalo, N. Y., one 40-kilowatt direct connected generator; Robert Walker, M.D., Warnerville, Pa., one 100-light and one 250-light ring type dynamo; G. M. Angier & Company, Boston, Mass., one 3 horse-power Manchester motor and one 250-light ring type dynamo; William Oswald, New Orleans, La., three 5 horse-power, one 10 horse-power, one 15 horse-power and one 30 horse-power Manchester type motors; through J. Holt Gates, of Chicago, western contractor, one 60-kilowatt 220-volt multipolar generator to be direct connected to Ideal engine, Westville Coal Company, Danville, Ill.; one 60-kilowatt 220-volt multipolar generator and one 85-kilowatt 220-volt for other electric coal mining works, of which class of work the Mather company is making a specialty; one 30-kilowatt and one 45-kilowatt multipolar generator for isolated lighting works; B. F. Sturtevant & Company, Chicago, two 20 horse-power Manchester type motors; and Burtis & Howard, Minneapolis, Minn., one 250-light ring type dynamo, third order.

Incandescent Lamp Manufacturers Confer.

A number of incandescent lamp manufacturers recently held a meeting in New York city to discuss matters relating to the lamp business in general. While the meeting was not largely attended, it is understood that all the prominent makers of lamps were interested in it and have been apprised of what was done. It is said that it was, or will be, agreed not to make any further cuts in the prices of lamps. The meeting was not largely attended and the proceedings were informal in character.

Addresses Received.

Our recent request for the address of the maker of a machine for cutting names on metal by electricity has been answered by two correspondents—one in New York and one in Chicago. The addresses of two makers of different machines are given.

The Jacksonville, Fla., city lighting plant has begun commercial lighting with 1,500 incandescents and 70 arcs.

ELECTRICITY

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Mechanics; Mechanical Drawing; Architecture; Architectural Drawing and Designing; Masonry; Carpentry and Joinery; Ornamental and Structural Iron Work; Steam Engineering (Stationary, Locomotive or Marine); Railroad Engineering; Bridge Engineering; Municipal Engineering; Plumbing and Heating; Coal and Metal Mining; Prospecting, and the English Branches. Until further notice experimental apparatus will be furnished *free* to students. Send for Free Circular, stating the subject you wish to study, to

THE INTERNATIONAL CORRESPONDENCE SCHOOLS, Scranton, Pa.

WANTED BY A YOUNG MAN of experience, a position as superintendent of an electric light plant. Good references. Address "H," Care of ELECTRICAL REVIEW, 13 Park Row, New York.

Storage Batteries
FOR ALL PURPOSES.
Bradbury-Stone Electric Storage Co.,
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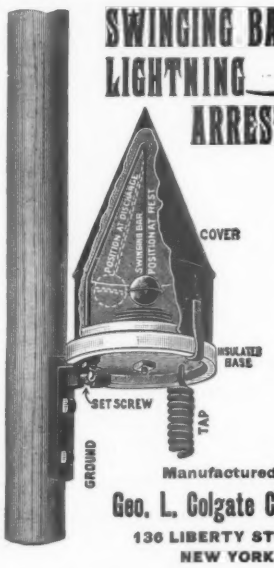
SWINGING BALL LIGHTNING ARRESTERS.



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FOR ALL
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WORKS, PERTH AMBOY, N. J.
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Creosoted Lumber, Underground Conduits. Telegraph Poles, Piling and Ties Furnished.

The Consolidated Electric Storage Co.,
44 Broad Street, New York.

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Sight Feed Oil Cups. AUTOMATIC "WIPING DEVICE" For oiling Crank and Cross-head Pins.
WM. H. WILKINSON & CO.,
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FOR SALE.

Two 40 horse-power Otto gas engines, in perfect order, having just been thoroughly overhauled at the Otto Engine Company's factory, and are at their works for shipment. For particulars, write

NEW ENGLAND ENGINEERING COMPANY,
WATERBURY, CONN.

Official Notice No. 46.

(PUBLISHED BY AUTHORITY OF THE COMMON COUNCIL OF THE CITY OF SHEBOYGAN.)

NOTICE TO ELECTRIC LIGHT CONTRACTORS.

Office of Board of Public Works,
Sheboygan, Wis., March 23, 1895.

Sealed proposals will be received at this office until April 29, 1895, at 3 o'clock P. M., for lighting the streets of the city of Sheboygan for the term mentioned hereinafter, upon the following conditions:

I. Price per lamp per year, for 128 or more Electric Arc Lamps, of full 2,000 candle-power, to burn every night in the year from 30 minutes after sundown until 30 minutes before sunrise.

II. The entire plant to be of the safest and most approved pattern and quality, and every reasonable precaution taken to guard against danger and damage to persons and property.

III. Each bid to be accompanied by a bond or deposit of Five Thousand Dollars ($5,000.00), conditioned upon the bidder promptly entering into a contract, should the contract be awarded to him, and in case a bond is given the same must be executed by sureties living within this State who shall justify in at least twice the amount of the bond.

IV. The Board to reserve the right to reject any and all bids.

V. All poles, wires and lamps to be erected under the supervision and approval of the Board of Public Works.

VI. The time and place of opening the bids, April 29.

VII. Separate bids to be made for the terms of 5, 10, 15 and 20 years.

All bids must be stated in writing and in figures, otherwise they will not be considered.

All money deposited will be returned to unsuccessful bidders on award of contract, and to successful bidders when contract is entered into.

The Board reserves the right to reject one or all bids.

H. J. WEIGAND,
PAUL T. KREZ
FRED ROSENTHAL,
Board of Public Works.

Countersigned
JOHN SCHMIDT, Compt.

Trade **ROLL DROP** Mark.
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Full particulars on request.
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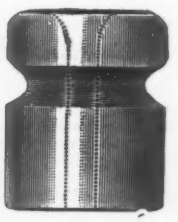
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